THE IRON AGE — December 13, 1934

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Are All Men Equal?

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Clear the Track, Mr. President!

THE meeting of business men and industrialists held in New York last week to discuss and develop a unified recovery platform has large significance. It means recognition of the belief that the Administration wants the help of business men in speeding recovery and it also signifies that business men stand ready and eager to give this help.

This is the first time since the beginning of the depression that such coincidence of aims has been possible and we believe that it marks the end of the depression.

So long as the magical white rabbits were popping out of hats with alarming frequency, business could not know what to expect from one day to the next. The "visibility" was low, to use an aeronautical term, and not being able to see ahead, business men entrusted with the use of other peoples' money properly hesitated to risk it by plunging into the unknown.

The white rabbits have had their fling. Their day is past. Visibility is improving and soon business will be able to see far enough ahead to make long term commitments. The fog began to lift when the President affirmed his belief in the philosophy of private initiative and the profit motive.

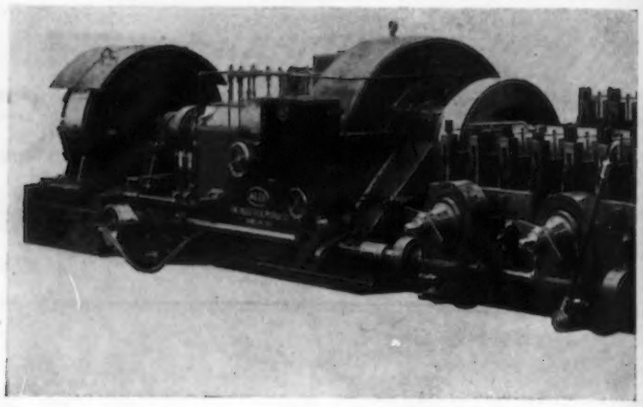
The response of business to his stand should be a source of gratification to him. Knowing that the public looks to him for recovery, and that he needs the help of business to attain it, is it likely that Mr. Roosevelt will hesitate to remove remaining obstructions to recovery when they are called to his attention?

The Tugwell threat of regimentation has been removed. The Green threat of union labor dictatorship is on the way out. The chief remaining obstacle to business confidence is the Ickes threat of uncontrolled and unlimited disbursement of public funds.

If the President will disperse this threat by placing some reasonable and definite limit upon Mr. Ickes' freehanded disposal of public funds, there will be no need for a gigantic public works program. Private works will take up the employment slack at no cost to the taxpayer.

Clear the track of this remaining obstruction, Mr. President, and the business train will speed toward the destination of recovery at full steam ahead.

J. H. VanDeventer



Wrought Steel Wheels

By M. M. McCALL

MODERN transportation by rail demands rigorous safety measures which must include the use of adequate materials in rolling stock and maintenance of way. Use of suitable wheels is particularly important, for here is the focal point of safety. Upon wheels rests the major share of responsibility. The failure of one wheel among many thousands, while a small percentage, may result in a very serious accident.

During the manufacture of Carnegie Wrought Steel Wheels, every means is employed to make a product as good as skill and knowledge can create from the best materials with superior equipment. This article will attempt to describe the features of the Carnegie process.

The steel for the manufacture of car wheels is made by the open-hearth process and cast into ingots all of which have the same dimensions. The ingots are 16⅞ in. diameter on the big end and taper down to 15½ in. on the small end. They are 85½ in. long and are cast with the big end up. Hot tops are cast on the ingot to insure good metal throughout the entire length. All car wheel ingots are now made with 12 corrugations, ⅜ in. deep. These ingots are smaller in diameter than those previously used, and it is claimed that less segregation of the metal occurs in the smaller ingots.

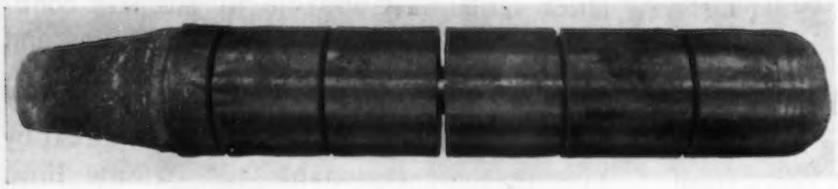


Fig. 2—Ingot after slicing operation.

Ingots Sliced by Powerful Lathe

When the ingots are cool, they are sliced on the powerful Niles ingot slicing lathe shown in Fig. 1. The spindle is rotated by a 200-hp. direct-current motor having a 4 to 1 speed variation. The spindle gear has teeth of herringbone type, and is built up of two forged steel rings, each 9 in. wide, shrunk and keyed on a semi-steel center. The gear is keyed to the spindle directly in back of the front spindle bearing, 200 tons pressure being used to press it in place.

Automatic chucks are attached to large flanges on the headstock and tailstock spindles. The main chuck body is a steel casting, cylindrical in form. Three hardened steel jaws with tapered backs provided with lateral movement, collapse about the ingot when it is pushed into the chuck. As the driving power increases, the jaws grip the ingot tighter. The small end of the ingot is placed in the headstock chuck and the tailstock chuck grips the hot top of the ingot as the tailstock is moved forward on the bed. The tailstock is traversed by a 10-hp. motor which drives a rotating nut confined in a bracket bolted to the end of the bed.

IN the safety of modern rail transportation, car wheels bear an important part. Failure of one wheel out of thousands represents but a very small percentage; yet that one wheel may cause a very serious accident. Careful manufacture, with frequent inspection, is necessary, therefore, and the practice outlined in this and the suc-

The end of the screw is attached to the tailstock and moves it along the bed as the screw moves through the rotating nut. The nut is rotated by a gear through a torque limiting friction so that the operator, when traversing the tailstock forward for chucking, can easily bring the chuck

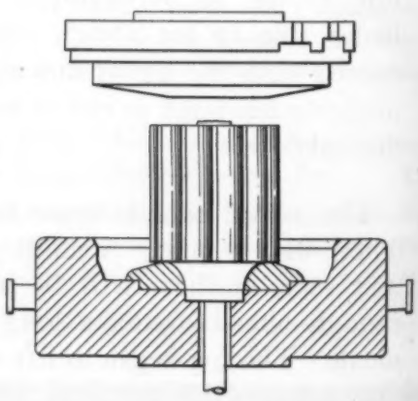


Fig. 3—Dies for first forging operation with disk in position.

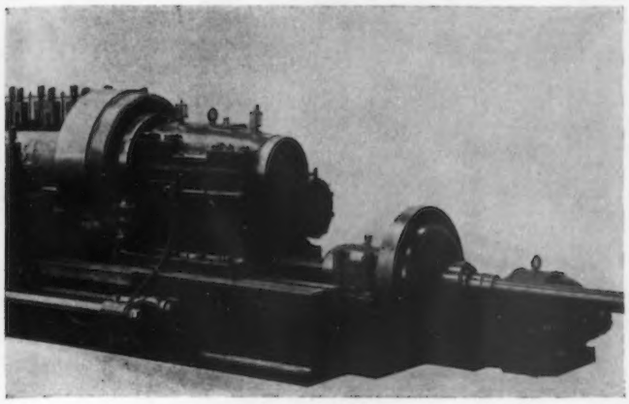


Fig. 1—Ingot slicing lathe.

Carefully Processed—I

ceeding article reflects procedure designed to assure maximum soundness of every wheel produced. In this installment Mr. McCall describes the slicing of the ingots, the forging and rolling and other steps up to the heat treatment which imparts rim toughness. The practice described is that of the Carnegie Steel Co.

up on the ingot with the right amount of pressure to grip the ingot firmly, the friction providing the necessary cushioning effect. When the tailstock is traversed forward, the ingot is chucked at both ends simultaneously. When it is traversed back, the slip friction becomes positive in action to readily free the ingot.

The tailstock spindle rotates as it is driven by the ingot through the chuck. Anti-friction bearings take up the end thrust on both spindles. When the ingot is chucked, the tailstock is clamped to the bed with pneumatic clamps.

Fig. 4—Shape of blank after first forging operation.

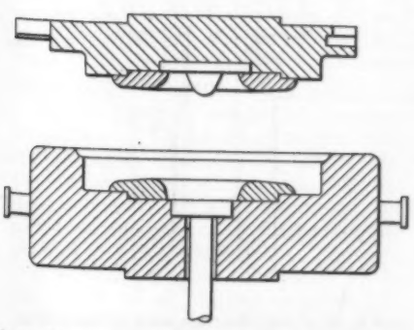


Fig. 5—Dies for second forging operation.

Cutting Speed Uniform from Full Diameter to Core

Two carriages are mounted on the bed, each having adjustment along the bed by hand or power. Front and rear tool slides on each carriage are provided with feed toward the center of the ingot. The feed is taken from the driving mechanism in the headstock and transmitted to the tool slides by spline shafts along the front and rear of the bed. A clutch, operated by air, engages the feed to all tools simultaneously. Control valves are located on the front and rear of the lathe. The feed may be disconnected by positive tooth clutches on each tool slide to permit individual adjustment of the tools by hand. Rapid power movement of the tool slides is provided by a 10-hp. motor which is interlocking with and operates through the feed mechanism. The tool slides are provided with tee slots for clamping the tool holders.

As all ingots have the same dimensions, the thickness of the slices will depend upon the weight of material needed for the size of wheels being manufactured. Also, the thickness of each adjacent slice will vary somewhat due to the taper of the ingot. The tools are placed in accordance with these requirements.

The headstock, which is cast integral with the bed, contains gearing to provide three ranges of speeds to the spindle. Each range is suitable for cutting different material, and the gearing is arranged so that the slow speed of each range is the proper cutting speed on the full diameter of the ingot. The full range of the motor is therefore available for acceleration as the tools move toward the center of the ingot. A rheostat, mounted on the headstock, is positively connected to the movement of the tool slides. As the tool slides move the tools toward the center of the ingot, the speed of the driving motor is automatically accelerated providing a uniform cutting speed from the full diameter of the ingot down to a core of 3½ in.

Slices Broken Into Disks, Which Are Later Forged

When the ingot is removed from the lathe it is sliced similar to the one shown in Fig. 2. It is moved on a roller conveyor to a steam hammer, where a wedge is hammered in each slot breaking off the slices into disks. These wheel disks are then subjected to a rigid inspection. The fractured surface of the center provides an opportunity to observe the structure of the metal.

The disks are conveyed to the wheel shop and loaded in buckets for preheating. It is considered important to slowly preheat the disks before subjecting them to the forging tem-

Fig. 6—Shape of blank after second forging operation.

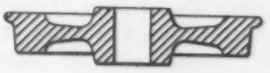


Fig. 7—Blank after the punching operation.

peratures. The buckets are slowly pushed through the preheating furnace by a hydraulic pusher. The temperature at the cool end of the furnace is 100 deg. F. and the disks are slowly heated to a temperature

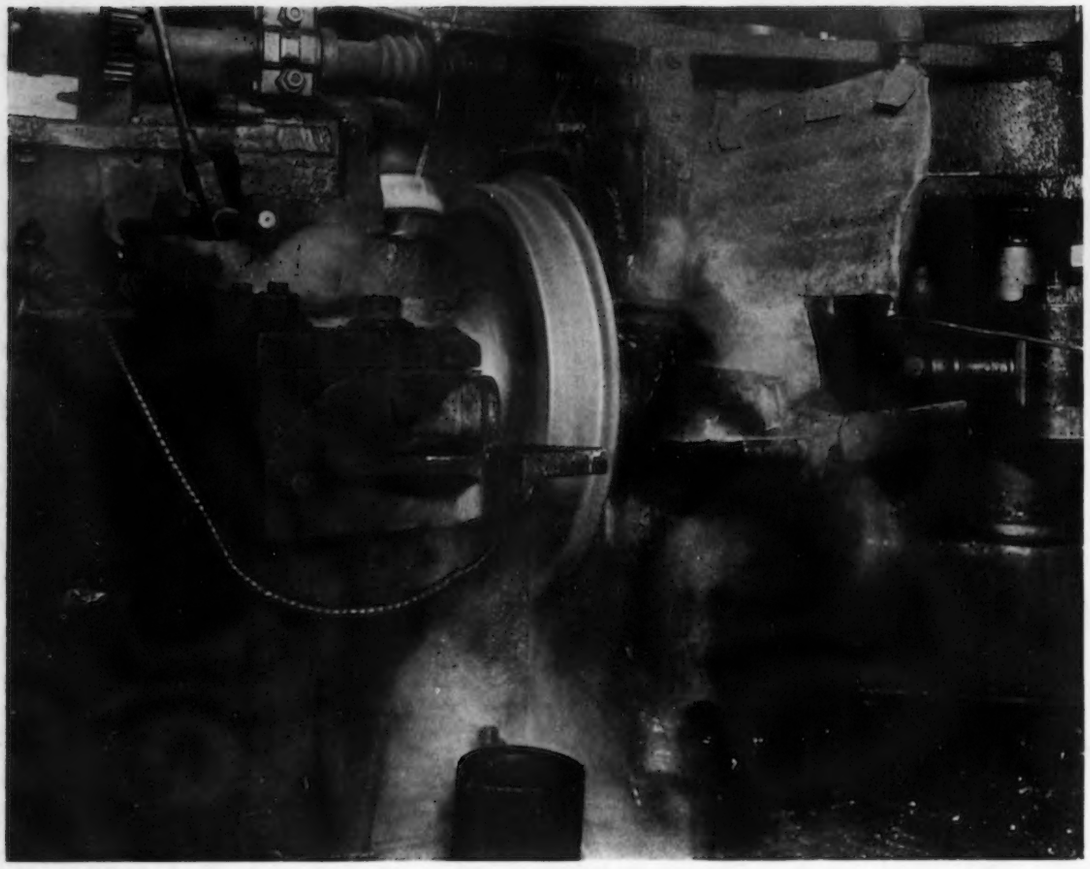


Fig. 8—Rolling a blank in the mill.

of 400 deg. F. All furnace temperatures, together with the amount of natural gas being used, are accurately recorded for each furnace used during the entire manufacturing process.

After preheating, the disks are removed from the buckets and laid on benches. They are then picked up by a charging machine and placed in a furnace where the disk is heated to the proper forging temperature and then removed by the charger and placed in the dies of a 7000-ton forging press for the first forging operation. These dies with the disk in place are shown in Fig. 3. The shape of the blank after the first forging operation is shown in Fig. 4.

This blank is put into a furnace and reheated for the second forging operation. It is then placed in the dies of another 7000-ton forging press. The side of the hub formed in the first operation is used to locate the blank in the dies, which are shown in Fig. 5. The shape of the blank after the second operation is shown in Fig. 6.

Without reheating, the blank is placed in an 800-ton punch press and the hub is punched to the proper dimension, Fig. 7.

Heat Equalized for Rolling Operation

The blank is removed from the hub punching press and placed in a furnace and the heat equalized for the rolling operation.

A view of the rolling mill is shown in Fig. 8, and diagrams of the rolling operation in Figs. 9 and 10. The blank is mounted on a mandrel through the punched hole and placed in the rolling mill. It is guided horizontally, supported on the mandrel, until it contacts the large roll which forms the flange and tread. The center of this roll is fixed in the machine. The two rolls that form the sides of the rim are mounted on eccentric shafts which may be rotated by the worms to give the required thickness to the rim. The horizontally mounted web rolls are made in pairs for each size of wheel. They are rotated by an 800-hp. motor, and are the only driven rolls on the mill. These two rolls are swung toward each other by power and contact the heavy part of the web near the rim. Continued movement forces the blank against the tread-forming roll and the two side rolls, and forms the rim of the wheel. Further closing of the web rolls forces the excess metal in the web of the blank toward the hub and increases the diameter of the blank. When the web rolls reach their final positions, the web will be correctly formed. Salt is sprayed on the blank during the rolling operation to clean off the scale.

After the rolling, the blank is stamped, the brand, month and year, serial and heat numbers being put on the flange side of the rim. Care is taken to see that blanks from the same heat are charged in the furnace at the same time and rolled consecutively.

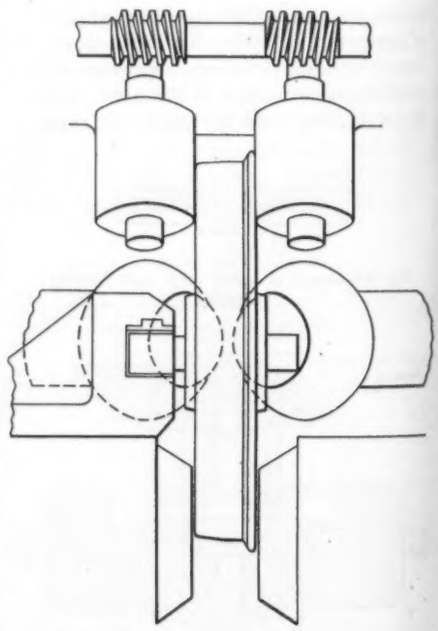


Fig. 9—Front elevation view of the rolling operation.

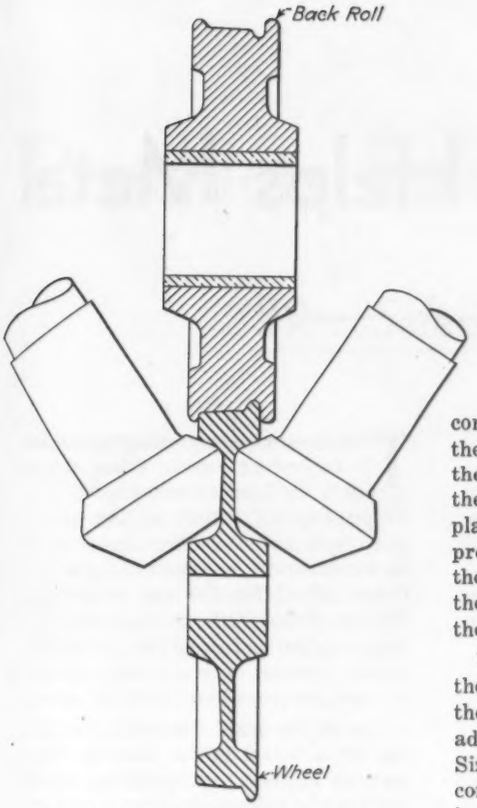


Fig. 10—Sectional plan view of the rolling operation.

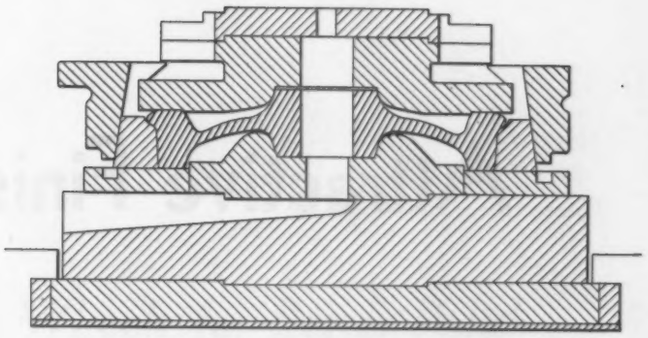


Fig. 11—Section view of coning and sizing dies.

Without reheating, the blank is placed in a 2000-ton press for the coning and sizing operations. When the blank comes from the rolling mill, the hub is central with the rim. In the coning operation, the blank is placed in holding dies and the rim is pressed down until the hub is offset the required amount. Fig. 11 shows the coning dies and the blank after the coning operation.

The coning ram is then lifted and the sizing operation is performed on the same press which is equipped with additional rams for this purpose. Sizing wedge blocks with the correct contour of the tread are placed loosely around the blank. The sizing rams press against a ring with a tapered interior surface which forces the sizing blocks toward the center. The ring is pressed down the required amount to give the correct diameter to the wheel and to form the circumference to a true circle. As there is a small space between adjacent wedge blocks which might leave marks on the tread, a second stroke is given with the sizing rams after the blocks are rotated half the circumferential distance between the joints. When sizing the wheels, the diameter is reduced causing compression in the web which is said to be more desirable than tension. Fig. 11 also shows the sizing blocks and the ring.

All wheels, after coning, undergo a thermal treatment, depending on design and the service for which the respective wheels are ordered.

(To be concluded)

Cabinet Sink Made of Sheet Steel

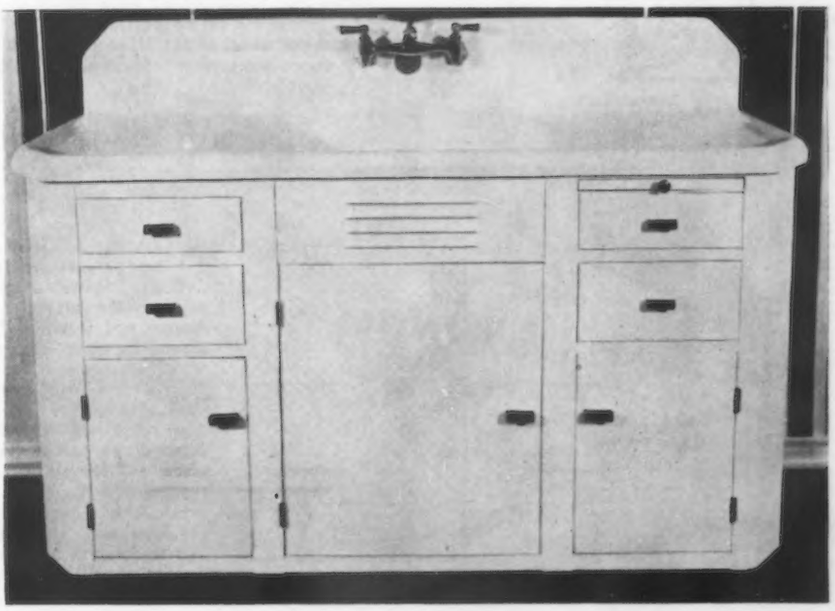
A CABINET sink of steel recently has been brought out by the Youngstown Pressed Steel Co., Warren, Ohio. This seems to be a logical evolution of the steel porcelain sink developed by the company about a year ago as a substitute for the cast iron enamel sink and provides a companion piece of kitchen furniture for the porcelain enamel stoves and electric refrigerators.

This cabinet sink of modern design is attractive in appearance and utilitarian in its purposes, as it provides storage room beneath the sink for kitchen utensils in space that is wasted by conventional sinks. These inclosed storage compartments include drawers for cutlery and linen and shelves for pans and kettles.

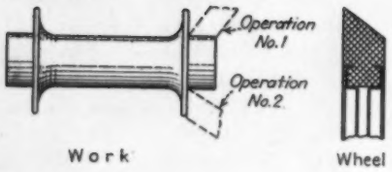
The sinks are made of 14-gage deep-drawing enameling sheets and are porcelain enameled on both sides, the under side being enameled for cleanliness. In vitreous enameling an acid-resisting coat is applied after the ground and two white coats. The cabinet is fabricated of cold-rolled sheet steel and is of welded construction and strongly built. The cabinet is finished in Dulux.

The cutting board is the only wood used in its construction.

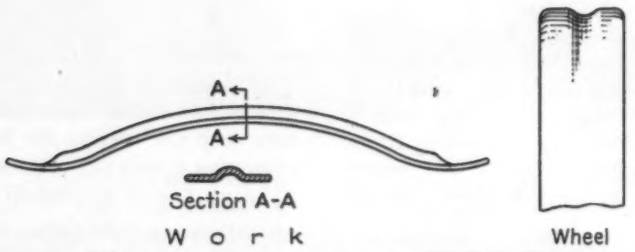
The cabinet is 22 in. front to back. The drainboard height is 36 in. from the floor and it is made in three widths, 60, 52 and 42 in., which are designated as Models 60, 52 and 42 respectively.



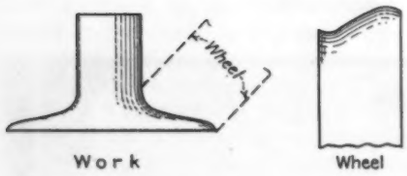
Attractive Finish Helps Metal



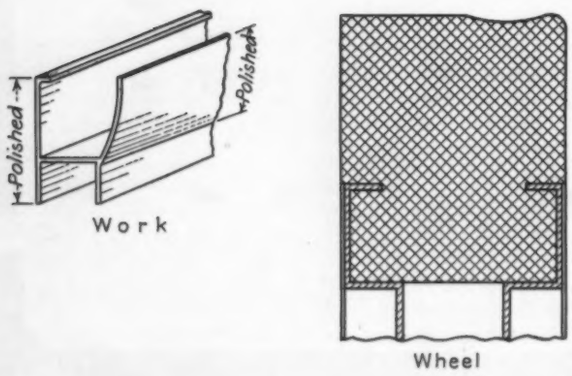
BUFFING a plated spool called for three operations. The central portion was finished with a clothflex wheel, medium density, with rounded corners. The two end surfaces were finished as indicated in two operations. Here close dimensions were required and the job was done with a compress leather wheel of a special shape as shown in the section.



A BUMPER guard with a raised central portion, as shown in the section, was successfully buffed with a soft clothflex wheel cemented to give sidewise flexibility and shaped with a central groove as shown. Round corners were provided on the wheel to polish the fillet between the raised center and the flat surface.



WHERE requirements were for a high polish but no great precision, a clothflex wheel of special section as shown was used with success.



A COMPLICATED T-section presented a difficult problem. High polish on the surface indicated was required. A special compress canvas wheel as shown in section at the right was used. The concave portion conformed to the curve of one part of the piece, and the flat portion polished the straight side. A fair degree of precision was specified and therefore a medium density wheel was used.

THE cost of a polishing operation is dependent among other things upon the kind of wheel used. Polishing experts called in for advice often are able to effect substantial savings merely by substituting a different wheel for the one in service. Wheels differ both in material and construction, and each particular polishing problem finds its best solution in some one particular kind of wheel.

One of the most important properties of a wheel is its density. This term as applied to a polishing wheel denotes the relative hardness or softness of the working surface. Resilience probably would be a more correct term, but the word density seems to be fixed in the trade and its meaning is well understood. In one type of wheel the range of density is from super-hard to super-soft, with six intermediate grades. The change from one density to the next harder or softer frequently may mean the success or failure of a polishing operation. Incorrect density, therefore, may result in much spoiled work with a consequent increase in cost.

Another consideration that often must be taken into account is the balance of the wheel. Certain types of wheels are much more easily balanced than others. Where precision work is involved, or where the finished work must be free from chatter marks, a wheel that is as nearly as possible in dynamic balance should be used. Certain types of wheels lend themselves to balancing much more readily than do others, and these latter may often be ruled out, notwithstanding that they have every other qualification for the job, because the conditions of the work may require a perfectly balanced wheel.

Balance also tends to reduce costs, for an unbalanced wheel sets up vibration in the work and the machine, with a resultant greater length of time required to produce a given quality of surface. Vibration also engenders fatigue, and the output of the workman using a poorly balanced

Products Sales

By ROBERT T. KENT

29—Selecting Wheels for Better Polish

THE bugbear of the finishing department frequently lurks in the wheel room and wherever polishing is important in the production of a metal part too much emphasis cannot be given to the selection of polishing and buffing wheels and to the method of their application. This article, one of a series on metal finishing being prepared by Herbert R. Simonds, analyzes the use of different types of wheels for various applications. Mr. Kent is consulting engineer, 32 West Fortieth Street, New York.

wheel may drop very materially during the latter half of the working day. An unbalanced wheel, therefore, may give rise not only to poorly finished work but to increased costs.

The types of polishing wheels in general use are the disk canvas wheel, the clothflex wheel made up of buff sections, and the compress wheel. The wood-block wheel, made of laminated wood to which is pegged and glued a strap of leather, has become practically obsolete, as has also the bull-neck wheel made of disks of bull-neck leather glued together to give the requisite width of face. Wheels of other materials such as felt and sheepskin disks have limited use and are indicated only in rare cases.

Disk Canvas Wheel for Rough Polishing

THE disk canvas wheel is essentially a roughing wheel. As its name implies, it is made of disks of canvas sewed or glued together to give the requisite width of face. Variation in density is obtained by building the wheel in sections, each section being composed of two, three, or more disks which are sewed together, and the sections thus made being glued together. The fewer the number of disks comprising a section, the harder will be the wheel. Variation in density also may be obtained by varying the number of concentric circles of sewing by which the several disks composing a section are joined. The more widely spaced the circles of sewing, the softer will be the wheel.

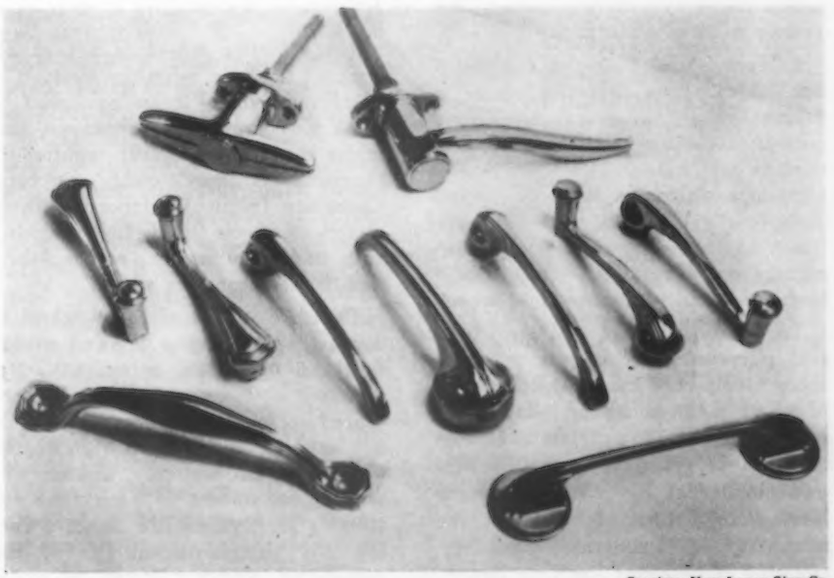
Disk canvas wheels are sometimes made by using sectors of circles instead of full disks for the intermediate layers of canvas in each section. This permits of economy in manufacture, as it enables material to be used which otherwise would be waste. Such a wheel, so far as its polishing ability is concerned, is fully equal to one made entirely of disks. Unless perfect balance is required, the wheel made up of sectors usually can be adopted as a matter of economy in first cost.

The field of the disk canvas wheel is for rough polishing, especially upon curved surfaces. It is practically the only wheel that will stand up under the severe usage of the rough polishing operations in agricultural implement factories and in the initial polishing operations on such work as automobile bumpers. The disk canvas wheel also should be employed for the breaking down of scale on surfaces that are to be polished, and for the removal of deep pits. These operations require heavy pressures, deep cuts and large-sized abrasive grain. Only a wheel of the rugged construction of the disk canvas type will withstand this combination.

Where the wheel is subjected to considerable side pressure, as in the finishing of plow mold boards, it is advisable to reinforce it with steel plates on each side, extending to within about 2 in. of the circumference of the wheel, and bolted together through the wheel. To lighten the wheel, concentric steel rings bolted through the wheel may be substituted for the side plates.

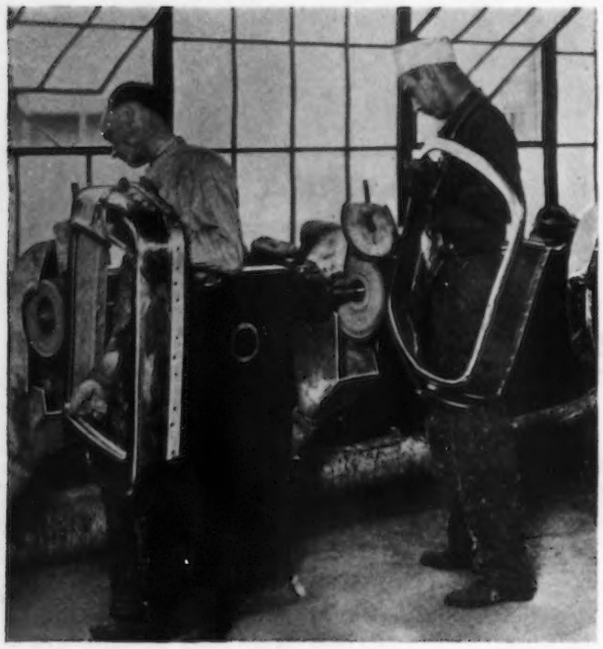
Clothflex Wheel a General Purpose Tool

THE clothflex wheel is made up from buff sections glued together to form the requisite width of face in the same manner as the disk canvas



Courtesy New Jersey Zinc Co.

Clothflex wheels with special contours were used for polishing these parts.



BOTH the quality and cost of hand buffing operations such as these are materially affected by the type of polishing wheel used.

wheel. Here variations in density are obtained principally by variations in the method of sewing the buff sections. The hardest density is made of buff sections which are sewed spirally from the center to the circumference, the pitch of the spiral being ¼ in. A softer wheel is obtained by increasing the pitch of the spiral, sometimes to as great as 1 in. The most common sewing, however, is a ⅜-in. pitch spiral. Still softer wheels can be made by substituting concentric circles of sewing for the spiral sewing, the spacing ranging from 1 in. up to 3 or 4 in. Very soft wheels are made of widely spaced concentrically sewed buff sections which are glued together only for a short distance out from the center hole and reinforced by two or more rows of hand sewing with heavy twine to hold the sections together.

A recent development of the clothflex wheel is the substitution of a flexible cement for glue for the purpose of attaching the various buff sections to each other. This wheel has a high degree of sidewise flexibility and is especially useful in finishing work which has irregular contours or deep corners or indentations which would be inaccessible to a more rigid wheel.

The clothflex wheel is a good general purpose wheel and is probably more widely used than any other type of wheel in the polishing industry. It has the advantages of low first cost and ease of giving it form to a limited number of contours for irregularly shaped work. It also has the advantage of considerable flexibility, enabling it to adapt itself to irregularities in the surface of the work. This flexibility, however, is a distinct disadvantage where it is necessary to avoid rounding edges or to avoid dragging out circular holes into ellipses.

The disadvantages of the clothflex wheel are its relatively short life compared to some other types of wheels, its uniform density, the difficulty of balancing it, and its tendency to streak the work. This tendency to streaking may arise either from the glue, with which the sections are held together, forming hard disks, which do not give under the pressure of the wheel on the work; consequently, they leave a bright mark on the work at the junction of the buff sections. In the case of a very soft wheel, owing to separation of the buff sections, a streak occurs from lack of pressure at the junction.

The clothflex wheel is not at all adapted to heavy roughing work. The fabric of which it is composed is weak as compared with canvas, and under the heavy pressure required in roughing it may easily rupture. Cases are frequently reported where clothflex wheels used for roughing have had large sections of the fabric torn bodily from the wheel.

The field of the clothflex wheel is distinctly that of the dry and grease finishing operation, using, say, No. 60 grain or finer, on work with contoured surfaces, or surfaces which do not have to be held to a high degree of dimensional accuracy, and on jobs where the volume is such that extremely long wheel life is not a factor. By this is meant life of the wheel itself and not life of the wheel head. For example, if a certain line of work to be polished would be completed in, say, a six-month period and never repeated, the clothflex wheel is indicated, provided it fulfills all the other requirements for the job.

It would be foolish expenditure of money to equip for such a job with a higher priced wheel, the reasonable length of life of which might be from five to ten years unless the wheel is a straight-face wheel, which can be used on a variety of other jobs. Clothflex wheels find their widest application on contoured work, such as faucets, pipe fittings, plumbing goods in general, finishing operations on automobile bumpers, fender guards, bumper guards and other contoured work. They also are almost exclusively employed in the finishing of the inside surface of frying pans and other cooking utensils.

Where the work must be highly finished with a fair degree of precision and absolutely free from chatter marks, the specification of the wheel should call for its manufacture from buff sections made of full disks. Such a wheel is intrinsically in good balance, and any lack of balance that may exist is much more easily corrected than is possible with the ordinary type of clothflex wheel.

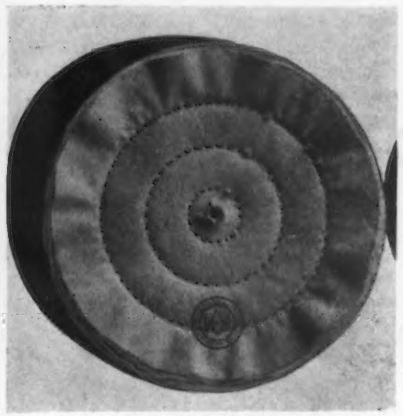
Users of polishing wheels, as a matter of economy, frequently fail to specify that the wheel should be constructed with metal bushings. Such practice is false economy for the reason that the hole in the unbushed wheel soon wears elliptical, throwing the wheel out of balance, with all of the evil consequences resulting therefrom. Furthermore, an unbushed wheel wears the machine spindle to a far greater degree than is considered possible merely in removing and replacing the wheel. In one instance the spindles of eight polishing lathes required replacement within 16 months owing to such wear.

Compress Wheel for Precision Polishing

THE compress wheel is essentially a precision polishing tool. It is built up of blocks of canvas, leather, walrus hide, paper, felt, etc., which are compressed radially and circumferentially into the desired form, and held between metal flanges which are bolted to a central hub. The chief advantages of this type of wheel are that its density can be varied to any degree of resilience that may be required for the work, it is capable of perfect balance, its face can be formed to fit any contour, and it has the longest life of any type of wheel made. Wheels which have been used for 20 years are not uncommon, and one instance is known of a compress

wheel which was taken out of serivce after 31 years of continuous use, with considerable life still remaining in the wheel.

Another great advantage of the compress wheel is its ability to finish work with a complete absence of streaking. This advantage is inherent in the construction of the wheel. In all disk type wheels, as previously explained, a streak of different color may occur at the junctions of the sections making up the wheel. In the compress wheel all junctions are



Courtesy Hanson Van Winkle Munning Co.

THIS buff is a familiar, machine sewed type for polishing small metal products.

transverse to the direction of motion of the wheel and the density is uniform across the face. Consequently there can be no hard or soft spots to cause variations in color of the finished surface.

The field of the compress wheel is practically universal. It can be used for practically every operation for which any other type of wheel can be used, with the exception of heavy roughing work and the finishing of glass. The face of the wheel can be formed to match any contour that it is possible to reach, and the wheel will polish these contoured surfaces without changing their form. A hard-density wheel will work into sharp corners with a minimum of rounding of the edge of the wheel.

By proper forming of the wheel and presenting it to the work at the proper angle, difficult jobs involving deep grooves may be polished over the entire surface of the groove. For example, the flutes of wood augers are finished by means of compress wheels. Other instances of the application of formed face compress wheels are the polishing of the curved surfaces of ball pein hammers, plier handles, bicycle hubs, automobile bumpers, the bolsters of table knives and forks, electric fan bases, machine handles, etc.

Wheels with a plain face and of hard or extra hard density should be used for the precision finishing of flat surfaces, surfaces where edges are to be held square and sharp, and surfaces containing holes which must not be dragged into ellipses by the action of the polishing wheel.

A typical application of the use of hard density compress wheels is the finishing of flat iron sole plates. A hard density compress leather wheel is used for the roughing operations while the finishing is accomplished by means of medium hard density compress canvas wheels. An example of the use of this type of wheel for precision work requiring the highest accuracy is the finishing of cold drawn steel flats. These are finished in a straight line machine using hard density compress canvas wheels. The required tolerance is +0.0005 in., —0.00 in. In some cases the work actually was held within the limits of +0.0003 in., —0.00 in. To accomplish these results it was necessary to have the wheels in perfect dynamic balance and to true them at operating speed so that the wheels when in service were truly cylindrical. The same wheel treatment was necessary in the finishing of flat iron sole plates.

The principal difficulty in specifying the correct compress wheel for a particular job is the determination, first, of the material to be used and, second, of the density. For the great majority of work in the average polishing shop the compress canvas wheel with a 2-in. cushion and of medium hard density will fulfill most of the requirements. Where corners are to be held square, or the rounding of edges is to be avoided, a hard density wheel is indicated. Where the contour is more or less irregular, where some rounding of edges is permissible and where a high degree of precision is not required, a medium soft or soft density wheel is advisable. Where there is some roughing work to be done with a grain no coarser than 60, and where the work is of precision character, such as the flat iron sole plates cited, the compress leather wheel is preferable. If a high color is desired, as in cutlery work, walrus hide or sheepskin is generally used.

Due to the wide variations in finish that may obtain from even a slight change in density, it is very difficult to lay down general rules for the selection of a compress wheel other than those given above. In all cases where work is involved on which the plant has had no previous experience to guide it in the selection of the proper wheel, it is advisable to submit the problem to the wheel manufacturer. From his broad experience in building wheels for every conceivable variety of work, he usually is able to make recommendations of material, cushion and density that will render satisfactory service.

What to Call for in Ordering Wheels

WHEEL users frequently cause themselves unnecessary delay and expense when purchasing wheels by failing to give clear specifications of the wheel that they desire. The following items are necessary in a wheel specification if the manufacturer is to build the wheels that the user desires: In disk wheels the diameter and face of wheel; the grade of the material of which the wheel is to be made; the sewing, as ¼, ⅜-in., etc., spiral sewing, or concentric sewing, with the spacing of the concentric rows, the diameter of the arbor hole, and any special instructions for gluing.

In the case of disk canvas wheels the specifications should also include the number of plies that go to make up a section and whether or not full disks or sectors may be used. In the compress wheel the specifications

THIS is a typical high quality polishing wheel with spiral sewing and with face prepared ready for use.

should include the diameter of the wheel, face of wheel, the diameter of the arbor hole, the material with which the wheel is filled, leather, canvas, etc., the depth of cushion and the density. If the wheel is to have a formed face, a drawing or template

(Concluded on Page 74)

Aluminum Masts for Racing Craft Find Favor in Cup Contests

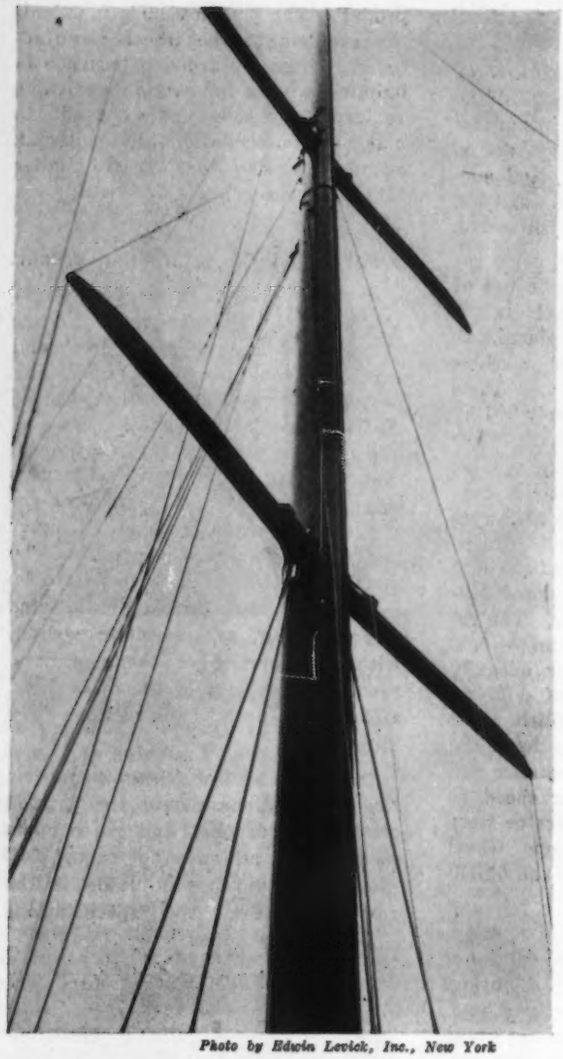


Photo by Edwin Levick, Inc., New York

WEETAMOE'S mast, identical with *Rainbow's*, shortly after it was stepped into the sloop.

BEFORE the 1893 America's Cup race the competing yachts were built of wood, but in that year, when Lord Dunraven pitted his *Valkyrie II* against *Vigilant*, the first metal ship made its appearance. *Vigilant's* underwater body was of Tobin bronze, smooth, strong, and with a tendency not to foul. This metal, which consists of 58 per cent copper, 40 per cent zinc and 2 per cent tin, has a tensile strength of 79,000 lb. per sq. in. *Vigilant's* sheer strakes were of steel.

Much Tobin bronze and steel went into the hulls of later vessels. These metals gave strength and weight below, thus counterbalancing the enormous pressure brought to bear on the whole structure by wind and sail. But weight, despite its advantages in hull construction, had a retarding effect, and to counteract this condition later yachting syndicates lightened the load above the water line.

For some time aluminum has been used to greater or less extent on the cup racers. The *Jubilee*, one of the trial horses for the 1893 race, had blocks of aluminum. *Shamrock I*, in 1899, had aluminum topsides. *Reliance*, the 1903 winner, had a deck of aluminum. Gerard B. Lambert's *Vanitie*, built for the 1914 races which were never held, had a jib topsail sprit, two jib topsail poles and a gaff made of aluminum.

Thus, more and more, as the years went by, did aluminum appear in the construction of the cup racers. But not until 1930, when the *Enterprise* carried a light stick into the races to win against the fifth and last *Shamrock* in four straight heats, was it used in mast construction. Harold S. Vanderbilt, *Enterprise's* skipper, ordered another aluminum mast built for *Rainbow*, and Frederick H. Prince, owner of *Weetamoe*, fitted a Class J sloop with an identical spar, in order that two masts would be available to the winner of the elimination races.

Why an Aluminum Mast?

The advantages to be gained from building a mast in metal are obvious, considering the innovations in mast design which were made by W. Starling Burgess, marine architect. First of all, the mast was tear-shaped and streamlined, a form which would have been next to impossible to build in wood; if built, its cost would be prohibitive. Wind tunnel tests showed that this type of mast would give less wind resistance than the ordinary round type.

Enterprise lessened wind resistance four years ago with a device which

was adopted for *Rainbow*. The halyards used to hoist and lower sails were rigged inside the mast, not along the outside. This was only possible because the skin of the mast was thin enough to allow ample space inside for these cables.

Improvements were also made on the truck, as described in ensuing paragraphs, which could not have been made on a wood spar. Last of all, the question of weight and its distribution was still a paramount issue. In 1930 the aluminum mast of *Enterprise* weighed only 4200 lb., whereas the weight of a wooden mast of similar proportions would have been more than 6000 lb. This reduction in mast weight was not allowable this year, however, as the English challenger requested, in his comment on racing rules, that the minimum weight of the mast be 5500 lb. The aluminum mast weighed 5685 lb., 185 lb. above the minimum, and thus the poundage saved in 1930 could not be saved this year; at least not in the same way. But the weight of *Rainbow's* mast was distributed in such a manner that most of it was toward the bottom of the mast, thus keeping the upper part of the mast as light as possible.

The mast was designed so that the point of balance was 69.3 ft. from the bottom when weighed horizontally. This was 42 per cent of the length. In other words, 42 per cent of the lower end of the mast balanced against 58 per cent of the upper end. This gave the mast a lower center of gravity than would have been possible in other materials and thus saved a certain amount of ballast which otherwise would have had to be put into the keel. Saving in weight meant, naturally, a lighter and faster ship. Any weight saved aloft would have a similar effect below, and a pound saved at the top is of more importance than a pound saved near the bottom of the mast. This rule deserved serious consideration in a mast the length of *Rainbow's*, as 154 ft. of it tower above the deck and 11 ft. are anchored in the hold.

COMPETING yachts in this year's America's Cup races were quite different from many of their predecessors in being more rugged and more seaworthy. They also had living quarters aboard, fresh water tanks and a galley, items which had not been in the requirements of previous boats.

Of particular interest, however, was the use of metals in highly specialized form where cost was scarcely a factor and the ideal material for a particular purpose could be freely sought. The craft built under these conditions combined a number of different kinds of metal, the uses of some of which have already been described in THE IRON AGE. In the issue of Sept. 27, page 30, the particular heat treatment of the chrome-nickel steel stay braces used to support the mainmast of the *Rainbow* was discussed. About 40,000 lb. of Cromansil steel was used in the hull construction of this yacht and the details of its application were covered in THE IRON AGE, Oct. 25, page 43. The accompanying article tells of the choice of aluminum for *Rainbow's* mast.

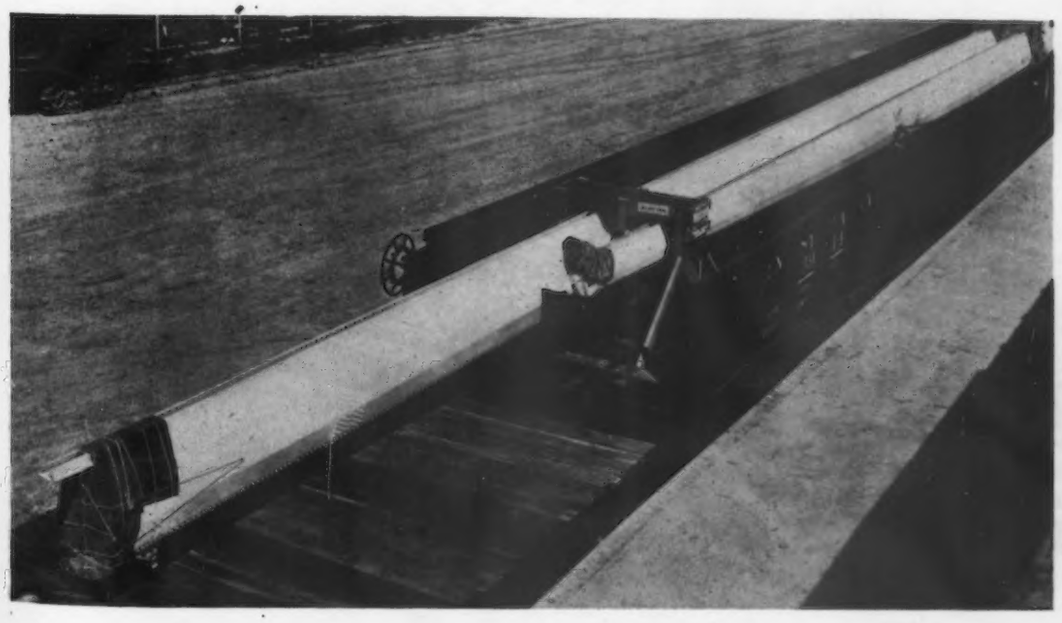
Mechanical limitations of construction require that certain minimum thicknesses of metal be used. This is particularly true at points where highly concentrated loads are introduced. To obtain a weight comparable to aluminum in heavier structural materials, the sections would have to be about one-third as thick. With aluminum only one-sixth of an inch thick at the top of the mast, the use of other materials would induce complications, and it would be practically impossible to employ the many new features of the mast truck because the relation of strength to lightness could not be maintained.

Rivets and Bolts Insure Strength

Fore and aft the mast is 30 in. long, while its thickness athwartships is 18 in. These dimensions taper to 15 in. by 9 in. at the top. Rivets and bolts along almost every inch of the mast, plus much welding at critical joints, insure strength. The thickness of the aluminum alloy employed was one-third of an inch at the base, tapering to one-sixth of an inch at the top. The cross-section of the mast is tear-shaped.

At intervals of every five or six feet, internal horizontal bulkheads give additional support. These bulkheads were strengthened with aluminum angles riveted to the plate. More than 20,000 rivets went into the making of the mast.

The halyards, which are used to hoist the sails and the bos'n's chair,



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***RAINBOW'S* mast ready for shipping. The gondola car is 65½ ft. long and the shortest section of the mast is 67 ft. long. The length of the longest section is 98 ft.**

▼▼▼

run up through the inside of the mast, and thus reduce the wind resistance ordinarily found when halyards are exposed. The halyards are saved from chafing by being guided by fairleads which are cut into the bulkheads. Each fairlead is insulated with a bakelite ring, thus preventing the halyards from rubbing against the rough edges of the metal and becoming frayed.

Top of Mast Intricate

The top of the mast, called the truck, which appears to the naked eye as a thin tip when viewed at a distance, is in reality an intricate piece of apparatus. An overhanging arm supports a sheave on which the mainsail is hoisted. On the mainsail is an eye which is fastened to a hook just below the overhanging arm. This hook takes most of the strain which ordinarily would be taken entirely by the sheave. On top of the overhanging arm, in the center of the mast, is a pin which holds the pennant.

The mast was built in two sections, one 98 ft. and the other 67 ft., in order that it could be shipped from Baltimore, and where it was built by the Glenn L. Martin Co., to Bristol, R. I., where it was stepped in the yards of the Herreshoff Mfg. Co. Special arrangements had to be made in order to obtain the proper size gondola car in which to convey the two parts, for a 65½-ft. car of the type finally used does not occur commonly in the yards of most railroads.

Both parts extended beyond the car on both ends, and flat cars fore and aft had to be coupled to the gondola car in order to protect the large sticks from damage.

In the manufacture of the mast an extruded aluminum section was riveted to the trailing edge of the stick, serving as a sail slide. Masthead fittings, sheaves, bulkheads, angles, boom tracks and removable butt joints were made of aluminum. The plates were double-riveted throughout and joined by butt-straps where they lapped.

Besides the aluminum mast, other aluminum applications aboard the *Rainbow* included 20 aluminum pipe berths, complete cooking utensil equipment, including tableware, suitable for feeding 30 persons, and eight aluminum folding chairs.

Other Naval Installations

Enterprise started a vogue with her aluminum mast which may well turn out to be permanent. Commercial production on aluminum masts was begun in England shortly after the 1930 races. Three Class M boats flying the burgee of the New York Yacht Club today have aluminum masts. Sailing canoes are beginning to use aluminum masts in this country, and fresh water schooners in Lake Michigan are finding them handy in races. Though the mast of the *Rainbow* cost $100,000, masts for smaller boats are in most cases cheaper in aluminum than in other materials.

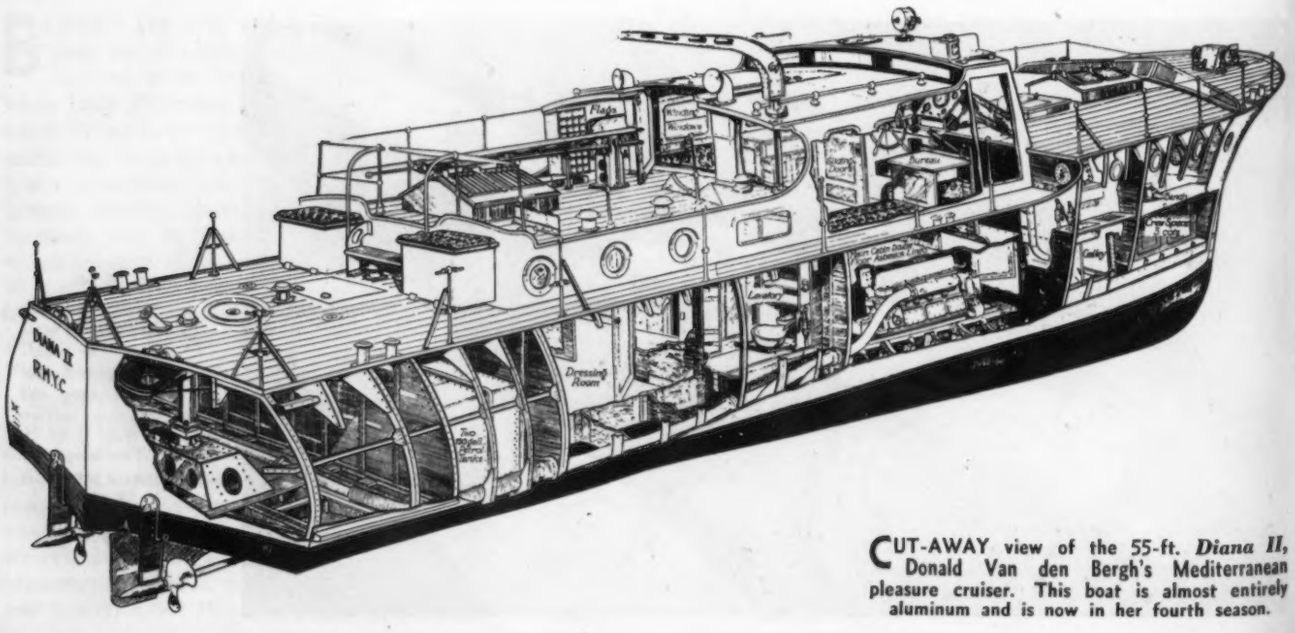
But the use of aluminum on naval craft is not limited to masts. Four years ago *Diana II* was built in England almost entirely of aluminum, and the performance of this 55-ft. day cruiser in the waters of the Mediterranean encouraged the construction of *Interceptor*, a 65-ft. patrol boat launched this spring for the Royal Canadian Mounted Police, and which is being used in the waters of the St. Lawrence River.

W. L. Stephenson's *Velsheda*, the only Class J sloop to race against *Endeavour* in the British trial races before the America's Cup race, has a 22-ft. tender whose hull is constructed of aluminum.

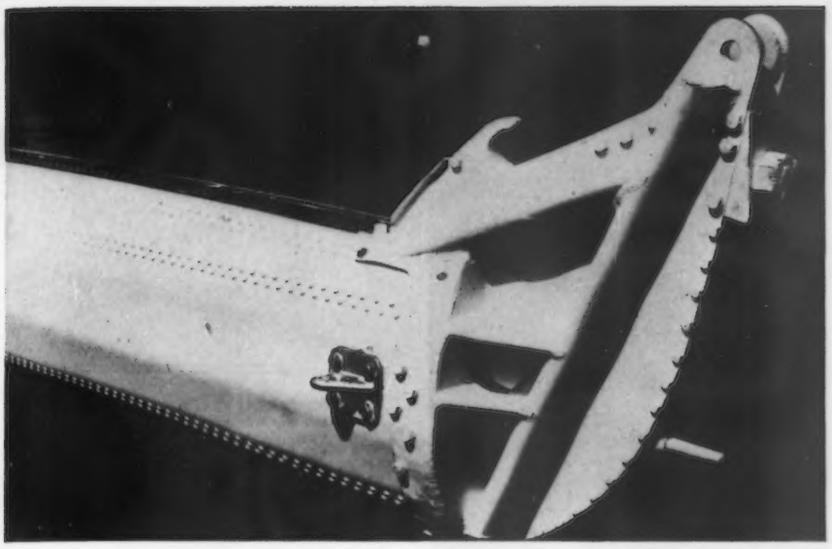
Aluminum alloy plate is used on *Interceptor* for the hull, the crew's lockers, interior partitions and deck plates. In addition it was used for the Y-section of the keel, for extruded angles riveted to the keel, for the stringers, and for the watertight bulkheads. Aluminum tubing was used for table legs and ladder rungs, aluminum foil for insulation. Stern tubes, rudders, rudder posts, cleats, bollards, sea cocks, ventilators, window frames, porthole frames and handrail sections were made of aluminum castings. Handrails of stranded aluminum cable run through cast aluminum supporting stanchions. The deck fittings are fastened down with aluminum rivets. Two 170-gal. fuel tanks, one 15-gal. fresh water tank, one 20-gal. lubricating oil tank, one 10-gal. kerosene tank, and two 20-gal. gravity fuel tanks are made of aluminum.

Many Aluminum Parts

Shell plating, deck stringer plates, tie plates, doublings, and deck bolts are of aluminum on *Diana II*. So is the ice box in the galley, the dresser, the cooker, the lockers and the cupboards, as well as the saloon fittings, the searchlight projector, the toilet, the wash basins, the towel and the glass racks. The deck over the crew's quarters is supported by an aluminum pillar. There is an aluminum mast, an aluminum motor dinghy, a cast



CUT-AWAY view of the 55-ft. *Diana II*, Donald Van den Bergh's Mediterranean pleasure cruiser. This boat is almost entirely aluminum and is now in her fourth season.

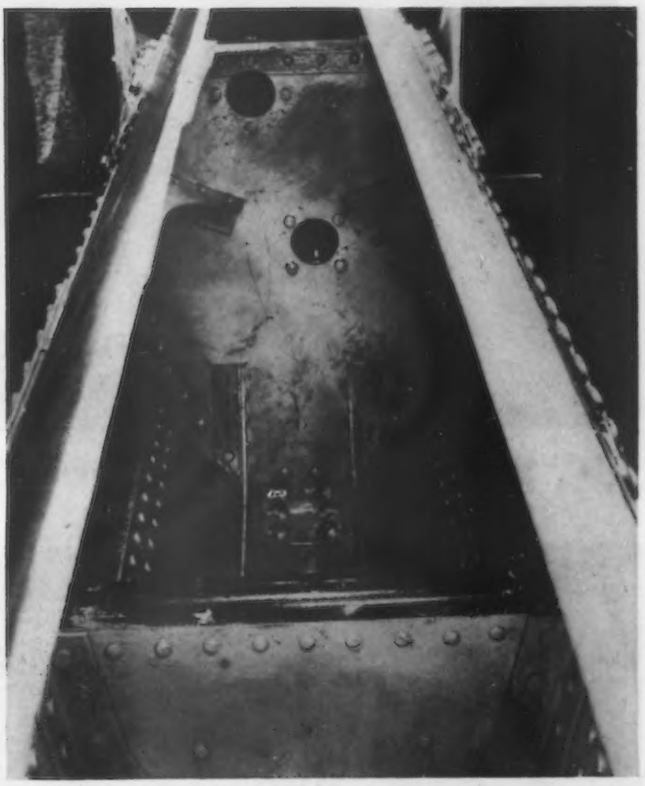


aluminum dinghy davit. The rudder truck seating, guard stanchions and wires, stern tubes and stern tube bosses, propeller shaft brackets and deck fittings, such as bollards, fairleads, cleats, stanchions, mushroom and cowl ventilators, engine staff sockets and deck lockers are also of aluminum.

Smaller boats, such as row boats, prams, dinghies, and six- and eight-meter racers have either been built of aluminum or have copious aluminum applications, particularly in England. Even ships' models have aluminum masts there.

ABOVE

THE truck of *Rainbow's* mast. Note the intricate welded, riveted and bolted construction, the sail slide and the hook to which the mainsail is fastened.



AT RIGHT

VIEW into *Rainbow's* mast. Note the two bulkheads and the fairleads with their Bakelite rings.

Glossary of Yachting Terms Used in This Article

AFT—near or toward the stern.

ATHWARTSHIPS—across the length of the vessel—from side to side.

BLOCK—a grooved pulley or sheave used for hoisting sails.

BOLLARD—an upright post around which to fasten a rope.

BOOM—the spar to which the foot of the sail is secured.

BO'S'N'S CHAIR — unabbreviated: boatswain's chair. A strip of wood slung by a rope through a hole in each end, used to sit on while working aloft. Similar to a child's swing.

BULKHEAD—a partition.

BURGEE—a swallow-tailed or triangular flag used as a distinguishing pennant by yachts.

CLEAT—a device having two arms used to secure a line.

DAVIT—a curved crane projecting over a ship's side or stern to hoist or lower boats or stores.

DINGHY—a small rowboat.

DOUBLINGS—the lining of extra planks or plates.

FAIRLEAD—a guide to keep a rope from chafing.

FLOTSAM—wreckage of a ship floating on the sea.

FORE—toward the front of the ship.

GAFF—the spar upon which the upper edge of a fore-and-aft sail is extended.

GEAR—general term for rigging.

HALYARD—rope or wire cable used for hoisting sails.

JIB—triangular lower headsail near the bow.

SAIL SLIDE—the groove in the after part of the mast in which the sail slides when being hoisted.

SEA COCK—a type of valve used to let water into the hold for various functional purposes.

SHEAVE—a grooved wheel or pulley.

SHROUD—a device, usually of rope or wire cable, and usually in pairs, leading from a vessel's gunwales to the masthead in order to give lateral support. Rainbow's shrouds were thin steel rods.

SLOOP—a vessel having one mast, one or more jib and a mainsail.

SPAR—general term for mast and booms.

SPRIT—a small pole or spar which crosses a fore-and-aft sail.

STAYS—wire cable supporting mast. There are fore stays and back stays.

STRAKE—one breadth of plates forming a continuous strip reaching from stem to stern on bottom or side. Sheer strakes: the plates on the upper parts of the sides.

STRINGER—a streak of plating carried round the inside of a vessel, secured horizontally on top of the deck beams.

TENDER—a vessel employed to attend other vessels.

TOPSIDE—usually in the plural. The portion of the outer surface of a vessel on either side above the water line.

TRAILING EDGE—the narrowest part of the tear-shaped mast, located at the rear end.

TRUCK—the head of the mast.

POURING a heat of melted brass from a Schwartz furnace into a ladle preliminary to casting.

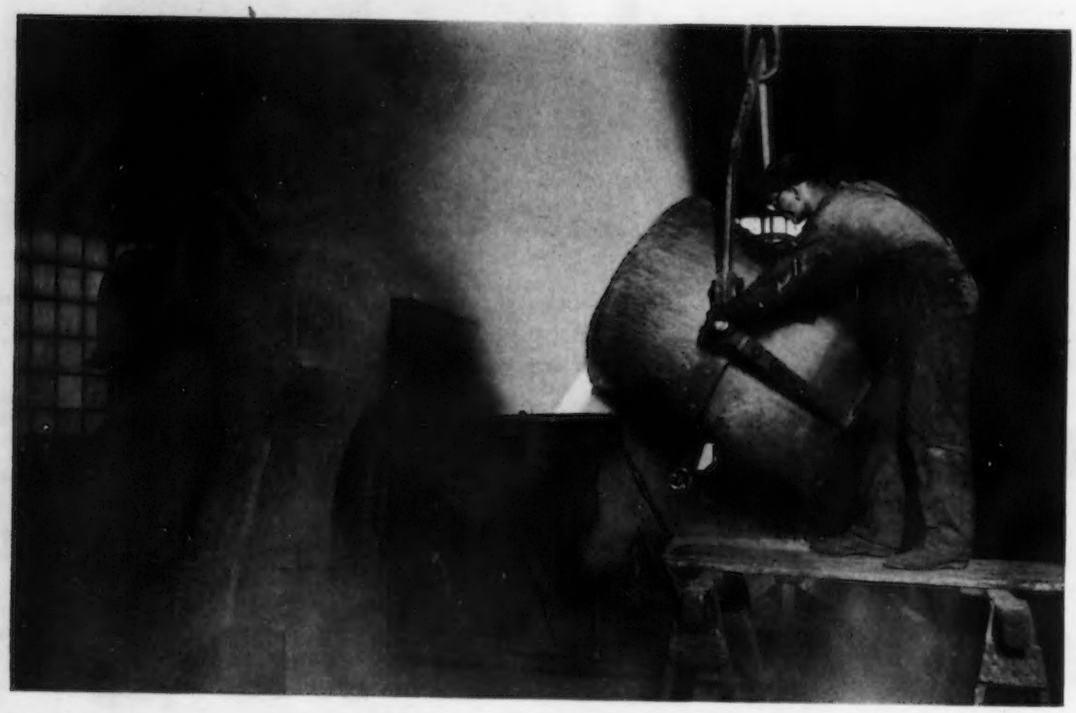
Large Brass o

By EDWIN F. CONE*

SOME 15 to 20 years ago the centrifugal casting of metals was largely in the experimental stage. Today it is an established commercial process for the production of certain iron and non-ferrous products.

Several American engineers have been pioneers in the development of this industry. The name of de Lavaud is internationally known. To his early efforts in this country credit must in a large measure be given for the establishing of the centrifugal casting of cast iron pipe. Probably not less than 80 to 90 per cent of this country's production of such pipe is

*Illustrations, courtesy of the Bethlehem Steel Co.



THE molten brass or other alloy is introduced into the revolving centrifugal machine by means of a special spout or trough.

or Bronze Products Cast Centrifugally

made by one centrifugal process or another—the de Lavaud or the Sand Spun methods.

Recognizing the possibilities of the centrifugal casting of non-ferrous metals, a few years ago the Bethlehem Steel Co. gradually converted a portion of its sand mold brass foundry into the present modern centrifugal department. In this department centrifugal castings are regularly being made of brass, bronze, or special alloys in any standard mixture. Special acid-resisting or non-corroding compositions are also included.

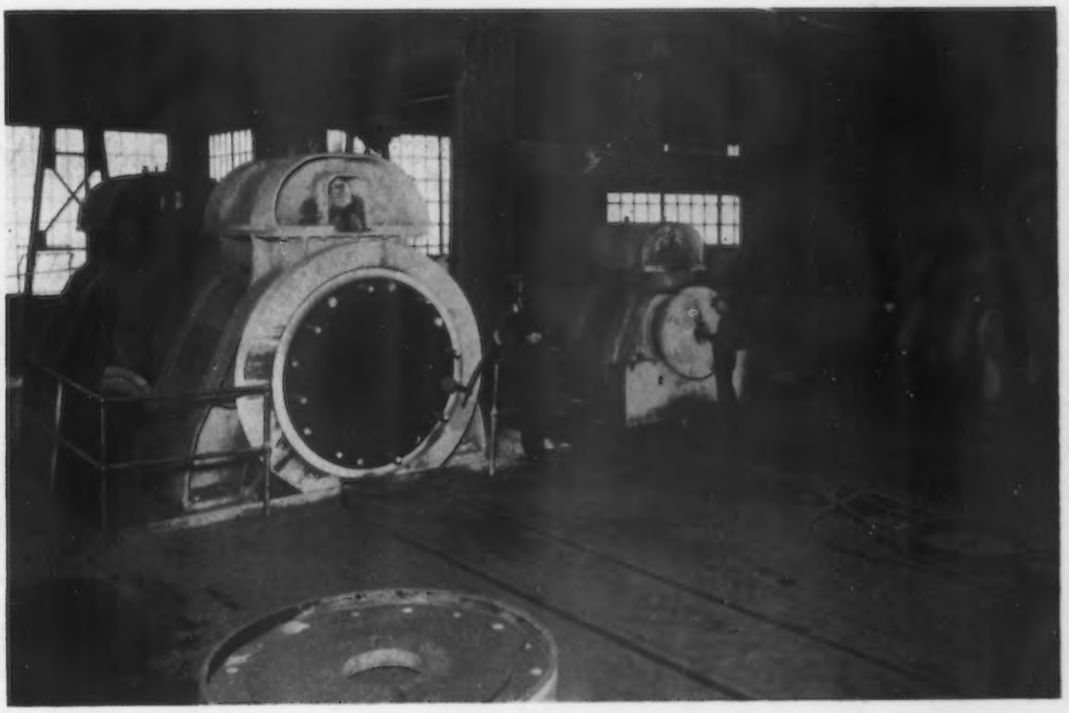
Before discussing some of the features and products of this department, a few words concerning the principles and advantages of the centrifugal process itself should be given. The principle of the process is simple and is generally known. Hot metal is poured into a rapidly revolving mold so that the centrifugal force throws it against the inside surface of the mold. It is held there by this force until it solidifies.

IN the non-ferrous field some noteworthy advances have been made in recent years. In some of the navy yards of the country some meritorious results in centrifugal casting have been obtained. But the commercial production of very large cylinders and similar shapes of brass, bronze and other non-ferrous alloys has for some time been achieved by one of the leading American steel companies—the Bethlehem Steel Co., Bethlehem, Pa.—which has a special foundry devoted to this work at its Bethlehem plant.

Whether cast iron, brass, bronze or any other alloy is used, the result is manifestly a product of uniform, close, dense structure free from segregation and porosity. Dust, slag or other impurities collect on the inside surface of the casting.

A striking feature of the Bethlehem foundry's cylindrical products is their size. They vary in outside diameter from 6 to 48 in. and in lengths up to 288 in. or 24 ft.—a truly remarkable range. Any product within these dimensions, from the smallest to the largest, can be made. Though cylindrical, some are cast with flanges.

To produce such a broad variety of castings the centrifugal casting equipment of the foundry consists of three large centrifugal machines. One handles molds which produce castings from 6 in. to 14 in. outside diameter. A second machine makes 14-in. to 24-in. castings, and a third, the larg-



THREE of the specially designed centrifugal casting machines for casting various sizes of products.

REMOVING a casting and the mold from one of the centrifugal machines.

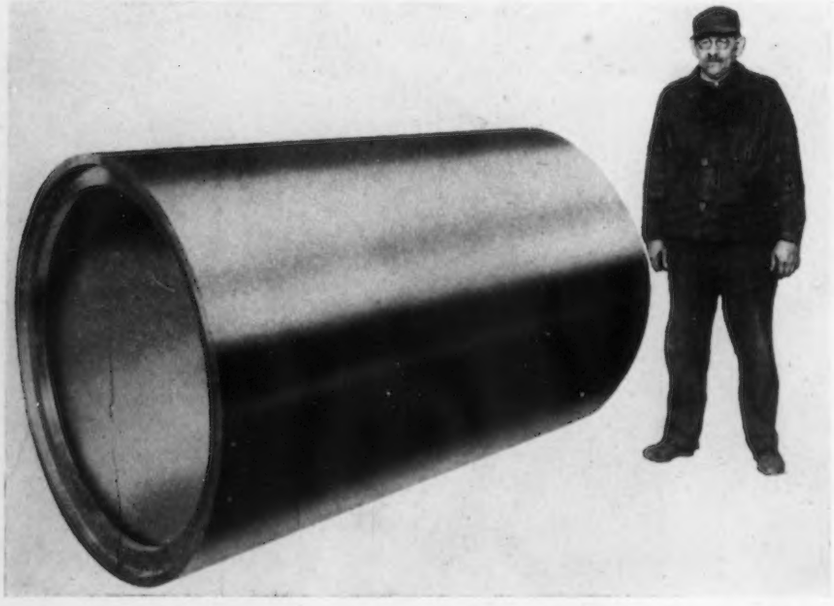
est, is capable of casting products from 24 in. to 48 in. outside diameter. The molds are specially designed and are revolved at varying necessary speeds by electric motors.

The specially designed revolving molds are sand lined. A wooden pattern is used to form the lining of the mold, the properly prepared sand being rammed in between the pattern and the metal mold. After proper drying and other treatment, the revolving mold is ready for insertion in the centrifugal machine. By means of a specially designed trough, the molten metal is poured into the mold as it revolves and the casting is produced. The mold is withdrawn from the machine and the casting removed.

The melting equipment for the various alloys consists of down-draft furnaces and of regular pit furnaces. There are three Hawley down draft Schwartz furnaces, two of 5-ton each and one of 1½ ton capacity. There are also nine 650-lb. crucible furnaces, gas-fired. The illustrations represent various steps in the process, together with some of the products.

Cylinders and other products can be made of brass, bronze and special alloys, in any standard mixture, or in special acid-resisting or non-corroding compositions.

Castings made in this foundry are being used in many branches of industry. Some of the leading applications include: Ship construction, paper and pulp mill machinery, chemical plant equipment, textile machinery, hydraulic equipment, liners for pumps and presses, driers, mining machinery and coke works equipment.



A finish machined bronze drier shell cast by the centrifugal process.

Unemployment Declined Slightly in October

THE total number of unemployed workers in October, 1934, was 9,604,000, according to an estimate by the National Industrial Conference Board. This is a decline of 345,000, or 3.5 per cent, from the preceeding month and a decline of 41,000, or 0.4 per cent, from October, 1933.

The gain in employment from September to October, 1934, was principally due to the settlement of the textile strike.

November Living Cost Declines Moderately

THE cost of living of industrial wage-earners declined 0.1 per cent from October to November, according to the monthly index of the National Industrial Conference Board. Living costs were 3.9 per cent higher than a year ago, but were 19.9 per cent lower than in November, 1929.

The purchasing value of the dollar was 123.8c. in November, 1934, compared with 123.6c. in October, 1934.

Mill & Marine Supply Co., 6028 Navigation Boulevard, Houston, Tex., has been organized to distribute industrial supplies and machinery and will occupy former storeroom and warehouse of Southwest Hardware & Marine Supply Co. H. F. Mengden is president.

Collective Bargaining and Wage Equilibrium

By J. C. BELDEN
President, Belden Mfg. Co., Chicago.

THERE is an economic price level at which enough industrial goods can be sold to afford jobs for every unemployed man in the United States. There is an economic wage level at which such goods can be made to sell at a fair average profit for the capital employed. This right industrial wage level must be attuned to the earnings of farmers, small proprietors and professional men whose incomes are subject to supply and demand, and who constituted in 1930 nearly 40 per cent of all those described in Government reports as "gainfully employed." The wages of different groups in industry must also be in equilibrium with each other—skill, desirability of the job, and all factors considered.

Collective bargaining on a compulsory basis was made a part of the NIRA, many people believing that the depression was caused by an unfair distribution of the proceeds of industry between capital and labor. This ancient theory was expounded by a German named Rodbertus in 1850, and rediscovered in recent years by Foster and Catchings. It is considered utterly fallacious by all orthodox economists, and has been comprehensively discredited in many written articles and by its complete failure after more than a year of actual trial.

Where a single factory in a small town furnishes the only employment it might be necessary that the workers should organize themselves into a union, so that a monopoly of workers could bargain on equal terms with a monopoly of employment. In an industrial city with many employers, a resort to collective bargaining is seldom necessary to secure a fair economic wage level. The labor market is very sensitive and the experienced employer knows that it is neither profitable nor satisfactory to pay wage scales below the market. In normal times a skilled worker employed at a substandard wage scale has little difficulty in finding another employer who will pay the market.

Raising the Wrong Wages

If compulsory collective bargaining has any tendency to bring a better equilibrium between the wages and the incomes of different groups, the past year was a peculiarly opportune time to afford proof. Results indicate that not only has no progress been made toward balanced wage levels, but collective bargaining has often raised the wrong wages and increased the disparity between certain groups. Reports of the American Federation of Labor show an increase in unemployment since a year ago in spite of the fact that the tendency of dollar devaluation is to bring a better relationship between wages and prices, tending to increase employment.

It is too much to expect from human nature that, under enforced collective bargaining, demands for increased wages will stop at that level best for all groups, both consumers and producers. Few of the workers understand these relationships and each group will endeavor to secure advantages over other groups, and demand all or more than the traffic will bear. This has already happened repeatedly. Some groups will secure higher wages than others because more aggressively led. Outside workers will gain advantage over inside workers because strikes to enforce collective bargaining can be conducted more successfully when the work is done in exposed places. Disequilibrium and unemployment is the certain result.

Leadership That Accentuates Disequilibrium

Imagine two candidates for president of a labor union. The first says, "I understand business and economics and I will strive for a wage level best adapted to benefit all groups, and bring maximum employment and payrolls to this particular group." The

second says, "I promise you a 25 per cent increase in pay with a 20 per cent cut in working hours." Is there any doubt as to which will be elected? Is there any doubt as to the kind of labor leadership this will bring, and the cost to the public in disequilibrium and unemployment?

Strikes are usually called when some coercive factor exists tending to a settlement based on some exigent situation, and not at all on what is the right economic wage level for that industry. Certainly all consideration of the right economic wage level was lost in the animosities developed in recent strikes at San Francisco, Minneapolis, Milwaukee, Kohler and the textile strike. Most of the demands for higher wages under collective bargaining have been made in industries already paying above average wages.

The forces of competition, if permitted to operate freely, will—within a reasonable time—establish the right economic price levels and wage levels. Wars, crop failures or unwise tariff policies may upset the economic balances, but the competitive efforts of individuals to improve their position in life will, if not interfered with, reestablish relationships under which all can work. No pump priming will be necessary if human ambition is not thwarted by impossible wage and price relationships. Granted these correct relationships, workers can be shifted from one industry to another, or from the farm to industry, in accordance with the public demand for the goods or services.

Industrial Market Unlimited

There is a limited domestic market for agricultural products, but an unlimited market for industrial products. A nation's capacity to eat is limited, but the desire of a people for more or better material possessions is practically unlimited. Never, even in the peak of 1929 prosperity, were the material wants of our population satisfied. If the United States chooses to adopt a tariff policy of economic isolation, then a part of our farm population must be transferred to industrial pursuits. Employment in industry for all these people can be found at a wage level at which goods and services can be exchanged among all groups of workers.

Will a lower wage level bring lower standards of living to the industrial worker? No, on the contrary it will bring higher living standards to those now employed and employment to those now unemployed. With competition, prices will be quickly adjusted downward, not only by lower labor costs but by lower overhead charges due to the larger volume of production.

The Key to Increased Consumption

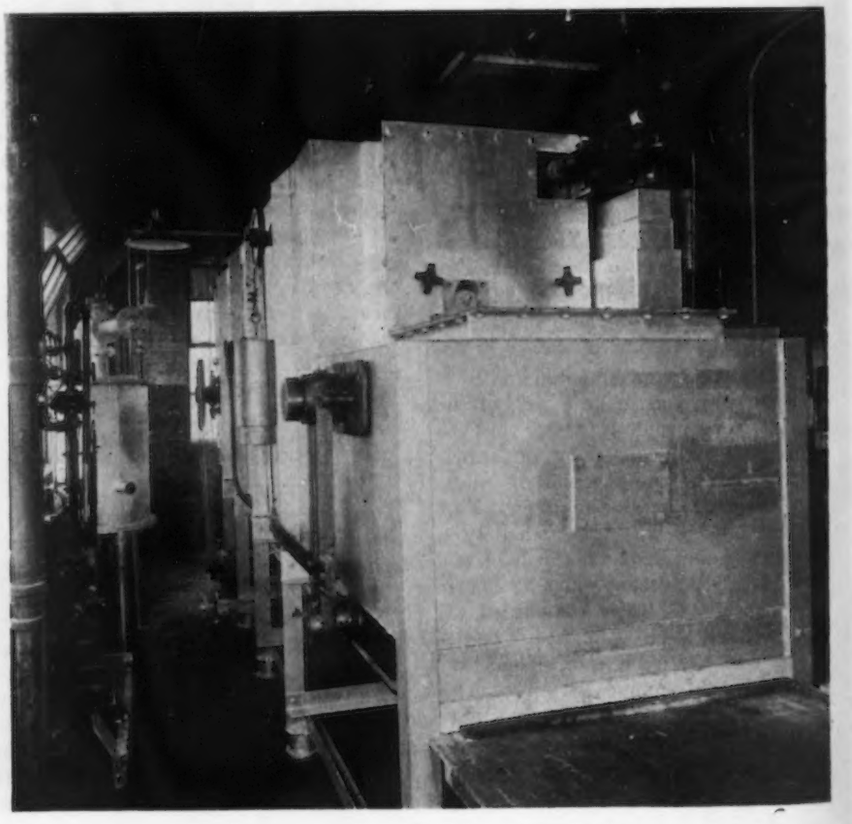
Every thoughtful employer can appreciate the truth of these statements in respect to costs and prices. What many cannot appreciate is the incredible increase in the consumption and the use of industrial products that would take place if there was any real parity between the wages and the incomes of all classes of workers. Our living standards would only be limited by the capacity of our magnificent industrial plants to produce and distribute goods. We would enjoy the highest living standards ever known in which all classes of people would participate.

Why can't this situation so vitally important to all be approached with common sense and courage, to the end that justice be done to all classes of workers? The economic law may be resisted while the resources of the country hold out, but when destitution and need become sufficiently acute it will again prevail.

Controlled Atmosphere Hardening Furnace

FOR the scale-free hardening of miscellaneous small and medium-sized products a controlled atmosphere continuous chain-belt conveyor furnace has been developed by the Electric Furnace Co., Salem, Ohio. The material to be treated is fed on to a rugged cast link belt conveyor, conveyed through the furnace in a special protective atmosphere and discharged through a sealed chute to the quenching bath. The material is said to come out clean absolutely free from scale.

A combustion-type generator is provided for supplying the special protective atmosphere used in the furnace. This furnace may be also used for bright annealing, clean annealing and the brazing of metal parts. The photograph shows the charging end of the furnace, the controlled atmosphere generator being shown in the rear.



German Steel Industry at Best Level Since 1928—Russia Places Orders

HAMBURG, Dec. 3 (*By Special Correspondence*).—The German steel industry continues to do a very satisfactory business. October output of 1,136,000 tons, the highest of this year, was 48 per cent ahead of last year and 67 per cent better than in 1932. Demand is maintained not only from domestic sources but also for export.

The German allotment for wire rods is now exhausted and makers are trying to find ways to increase their business by other methods. Under the cartel agreement they have to pass new business to other members. They are claiming that the barter business should be treated separately, as most of the contracts not offering the buyers barter possibilities would have gone to outsiders or other countries. The industry is asking for an increase in its allotment, and it is possible that some concessions will be granted to the German mills.

Demand for pig iron is also very good and stocks are depleted. Export call for hoops, tubes, strips and special steel is also improving.

Russia Places Large Tonnages

Russia has placed important orders with the central European steel mills, of which 19,000 tons, chiefly sheets, strips and plates went to Czechoslovakia, 12,000 tons to Hungary, 14,000 tons to Austria and 17,000 tons to Poland. Most of the steel is special and prices were consequently high. Hundreds of tons of armor plate, gun castings, etc., gave the order a special interest. Payment will be executed in short terms without long credits.

Russia, which is now exceeding Canada by nearly 20 per cent in gold production and is second only to South Africa, is able to pay her debts in gold. Nearly 180,000,000 gold marks were sent to Germany recently in payment of old debts. An agreement has been signed with Germany by which in the future, shipments of steel will be inspected and accepted in Germany and not in Russia.

Steel Profits Rising

The German steel industry, producing at the best rate since 1928, showed profitable balance sheets in the past month and earnings were considerable. Money is being reinvested for the first time since 1929. The five leading steel plants in West Germany will invest approximately 82,000,000 M. in new machinery and equipment, modernization and replacement of obsolete machinery during the next year. This investment will be possible without loans but from new earnings.

The German "dividend" loans make it impossible for any maker to increase its dividend when above 6 per cent by more than 1 per cent, and all excess earnings must be either spent in modernization of plant or in buying municipal or Government securities.

This program is of great assistance to the machinery industry. Metal working and machine tool makers are working three shifts and many are unable to accept more orders. Reduction of taxes to any manufacturers buying new equipment is also helping the machinery trade.

New Maker of Stainless

Stainless steel is now being produced in Germany by "C. Pouplier," Kabel, Westfalia. This company now has four different brands of stainless on the market, although it has not revealed details of analysis. Mechanical and physical properties are similar to the best known stainless steel qualities. As chrome-nickel steels of the 18-8 type are reserved by patent to Krupp up to 1942, no other steel plant can produce such steels in Germany. The new material is apparently of a new analysis.

November Steel Ingot Production Nearly Nine Per Cent Above October's Total

PRODUCTION of Bessemer and open-hearth steel ingots during November amounted to 1,589,049 gross tons, according to the American Iron and Steel Institute. This was an increase of 8.8 per cent over the October total of 1,461,932 tons and compares with 1,521,189 tons produced in November, 1933. The November daily rate also rose to 61,117 tons from 54,146 tons in October and 58,507 tons in November, 1933. The industry operated last month at 27.76 per cent of capacity, compared with 24.59 per cent in October and with 26.92 per cent in November of last year.

In the first 11 months of the year, total production of steel was 23,319,443 tons, while only 20,795,473 tons was turned out in the corresponding 1933 period. This year's output has also already surpassed total 1933 production of Bessemer and open-hearth steel which was 22,594,079 tons.

MONTHLY PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Gross Tons)

Reported for 1933 by Companies Which Made 97.82 Per Cent of 1933 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies Monthly	Calculated Output All Companies Daily	No. of Working Days	Per Cent Operation‡
January	885,663*	109,000	1,016,870†	39,110†	26	17.99†
February	922,798*	126,781	1,073,012†	44,709†	24	20.57†
March	784,111*	94,509	898,236†	33,268†	27	15.30†
April	1,180,823*	135,217	1,345,422†	53,817†	25	24.76†
May	1,716,425*	216,841	1,976,428†	73,201†	27	33.68†
June	2,211,652*	296,765	2,564,420†	98,632†	26	45.37†
July	2,743,326*	355,836	3,168,354†	126,734†	25	58.30†
August	2,430,663*	370,370	2,863,569†	106,058†	27	48.79†
September	1,991,204*	242,014	2,283,079†	87,811†	26	40.40†
October	1,847,690*	191,673	2,084,894†	80,188†	26	36.89†
November	1,331,029*	156,939	1,521,189†	58,507†	26	26.92†
December	1,629,495*	129,834*	1,798,606†	71,944†	25	33.10†
Total	19,674,879*	2,425,779*	22,594,079†	72,884†	310	33.53†

*Revised. †Adjusted.

‡The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for open-hearth and Bessemer steel ingots.

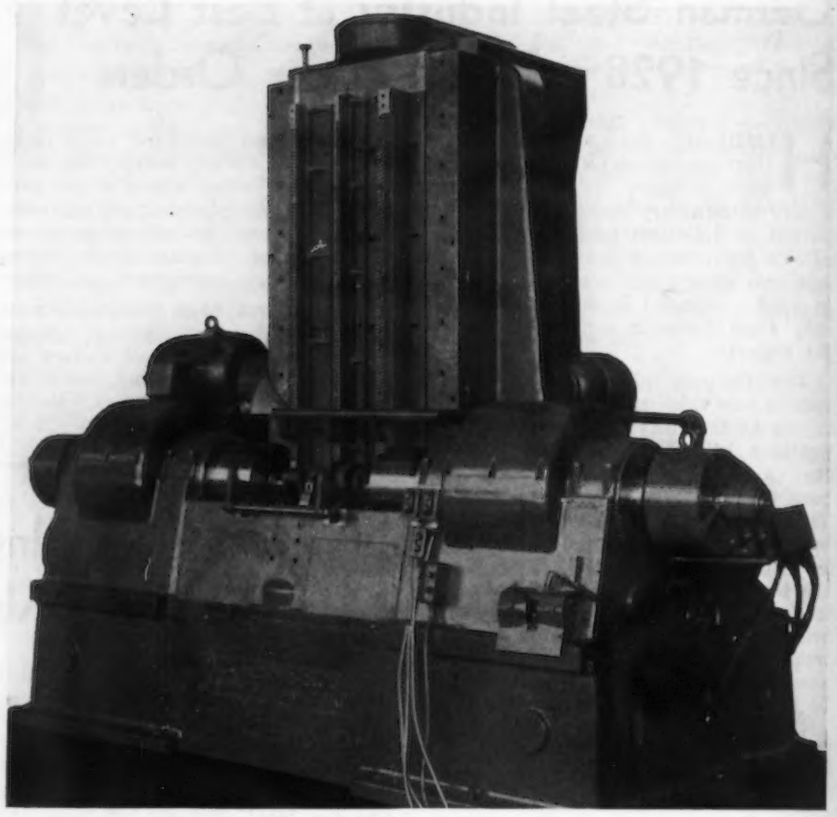
Reported for 1934 by Companies Which Made 99.39 Per Cent of Ingot Production in 1933

1934						
January	1,786,467	172,489	1,970,979*	72,999*	27	33.15*
February	1,993,638	175,873	2,182,826*	90,951*	24	41.31*
March	2,540,143	203,904	2,760,888*	102,255*	27	46.44*
April	2,622,372	257,482	2,897,539*	115,901*	25	52.64*
May	3,000,624	331,620	3,352,695*	124,174*	27	56.39*
June	2,714,983	282,592	3,015,972	115,999	26	52.68
July	1,343,732	119,869	1,472,584	58,903	25	26.75
August	1,245,445	109,598	1,363,359	50,495	27	22.93
September	1,126,415	117,580	1,251,630	50,065	25	22.74
October	1,325,225	127,789	1,461,932	54,146	27	24.59
November	1,447,297	132,059	1,589,049	67,117	26	27.76
Eleven Months..	21,146,341	2,030,855	23,319,443	81,537	286	37.03

*Revised.

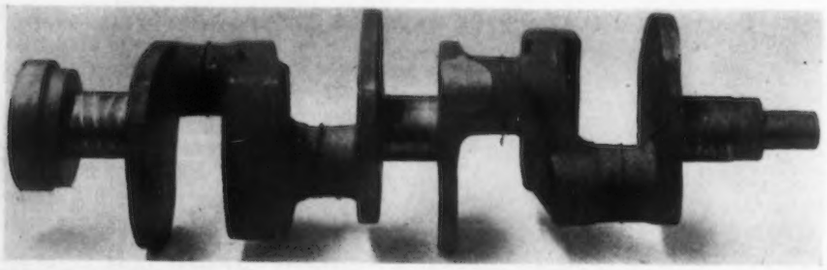
‡The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1933, of 68,478,813 gross tons for open-hearth and Bessemer steel ingots.

Develops Broaching Lathe for Machining External Cylindrical Surfaces

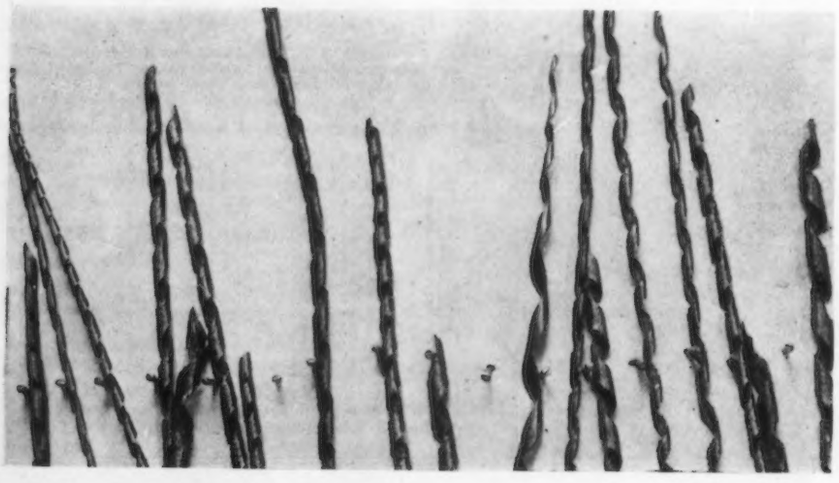


TO rough and finish "turn," fillet, face and shoulder the external cylindrical surfaces of various machine parts, Wickes Brothers, Saginaw, Mich., have developed a broaching lathe of radically new design. High production and long tool life are outstanding features of this machine, which is equipped with hydraulic chucks and is semi-automatic in operation.

The machine is in use in the plant of a large automobile manufacturer for turning, filleting and facing the three main bearings and the pulley diameter adjacent to the front bearing of a cast alloy crankshaft. This particular application is shown in the accompanying illustration. The broaches are arranged for both roughing and finishing operations and the work performed is accurate as to roundness of the parts and as to diameters.



The three main bearings and the pulley diameter of this crankshaft are accurately machined by the Wickes broaching lathe shown in the headpiece. Chips produced are pictured in view below.



Broaches are designed to provide free cutting at all times and to carry the chips away from the fillets and shoulders. The chips produced from the operation on the crankshaft are illustrated herewith.

Extensive tests have proved that this broaching lathe produces about two-and-a-half times the number of crankshafts per hour which can be machined on a modern double-end drive lathe using conventional high-speed cutting tools. One reason for its high output is the small amount of time required for tool changes, since the per-piece wear on the broaches is negligible. It is claimed that the broaches will turn out from 50 to 100 times the number of pieces per grind that can be secured from high-speed tool bits. The long wearing qualities of the broaches are shown by the record of tools broaches used over a year by several companies for broaching the center bearing of a crankshaft from the rough. Production of 5000 to 8000 forged crankshafts is said to have been obtained for each sharpening of the broaches.

Operation of the machine is simple. After the crankshaft has been placed in the hydraulic chucks and the operator has pushed the starter button, the machine goes through the rough and finish broaching cycle, stops automatically at the unloading position and automatically discharges the work out of the chucks on to the

(Concluded on Page 67)

ARC Welding Tantalum Sheets for Chemical Containers

TANTALUM sheets worth $50 per lb. and having a thickness of only 1/200 of an inch each, are now being arc welded in the manufacture of chemical containers. The metal tantalum possesses characteristics said to be especially valuable in the manufacture of all types of laboratory accessories. It is not tarnished by air nor attacked by acids, except hydrochloric. In tensile strength it is 2½ times greater than platinum. It combines softness with workability and has great resistance to wet corrosion.

Fansteel Products, Inc., Chicago, supplier of tantalum, has developed a method for welding this rare metal. The procedure requires special technique, certain factors of which must be considered in working the metal. Some of these are cited as follows: metal cost, approximately $50 per lb. —more than $3 an ounce. Tantalum products are custom-made, resulting in high labor cost which necessitates spoilage reduction at a minimum. Finished welds must be strong, ductile and both gas and liquid tight under pressure and vacuum. Tantalum cannot be deposited from an electrode without so embrittling the welds as to make them unusable. Tantalum cannot be heated in air much above 650 deg. without becoming hard and brittle. The melting point of tantalum is above 5100 deg.

The adopted method consists of first forming a straight angle flange at all edges of the sheets to be arc welded. These flanges are then fitted together and tack welded in a few places to avoid shifting the assembly. The work is then immersed in a tank filled with carbon tetrachloride so that the edge to be welded is approximately ¼ in. below the surface of the liquid.

Immersion in carbon tetrachloride requires higher voltage across the arc than would be needed to weld in air, and at the same time, the thinness of the stock being welded and the necessity for strict localization of the heat, demand low welding current. Hard carbon electrodes ⅛ in. in size, held in small light electrode holders, are used. The welding current must be of normal polarity.

Stability of the arc and ease of striking it as well as freedom from blowing, are absolutely essential for producing good welds. An open circuit voltage of 50 which falls to about 25 across the arc, usually produces satisfactory welds.

Current depends upon the thickness of metal, 0.005-in. stock requiring only 15 amp. and 0.025-in., 60 amp.

Welding is accomplished by melting the edges of the flanges so that the metal runs together. This must be done quickly, since holding the arc in one spot or striking it more than once in one place, is likely to result in brittle welds.

It is said by the Lincoln Electric Co., Cleveland, that fabrication is being carried on regularly with tantalum sheets 0.005 to 0.025 in. in thickness in the manufacture of chemical equipment.

Resistance Welding Used In Refrigerator Assembly

A SPECIAL seam welder manufactured by Thomson-Gibb Electric Welding Co., Lynn, Mass., is used in assembling the compression headers of electric refrigerators. The header is a ball-shaped unit made up of two half spheres, with outwardly turned flanges. The equipment is employed by the General Electric Co. and is shown on page 32. The bottom half of the header is positioned in the lower welding roll which is shaped to give accurate support. The top half is then placed under the upper or idler roll and quickly adjusted by a hand toggle work locator. A special worm drive operates the lower roll and a Reeves vari-speed pulley controls the welding speed within a range of 1½ to 4½ ft. a minute.

Nickel-Clad Steel for Soap Boiling Kettle

SOUTHWEST WELDING & MFG. CO., Alhambra, Cal., recently completed one of the largest soap boiling kettles yet constructed entirely from nickel-clad steel, for a Pacific Coast manufacturer. The kettle, composed of four courses between its butterfly cover and conical bottom, is 15 ft. in diameter. The straight portion, from the top of the kettle to the top of the cone, is 22 ft. in height. The cone is 7 ft. high on the vertical, making a total height of 29 ft. The cone is made of plates ⅜ in. thick, while the bottom vertical course plates are 5/16 in. The second and third course plates are ¼ in. and the fourth or top course 3/16 in. thick. Arc welding was done with Inco metallic arc welding wire No. 31. All of the plates were clad with pure, solid nickel on one side to the extent of 10 per cent of the total plate thickness, and have black oxide finish on the nickel surface. The heating coils and the discharge spout are pure nickel piping. See page 32.

In the processing of soaps the fluid mixture will come in contact only with the nickel surface of the piping. This surface is immune to rust and corrosion.

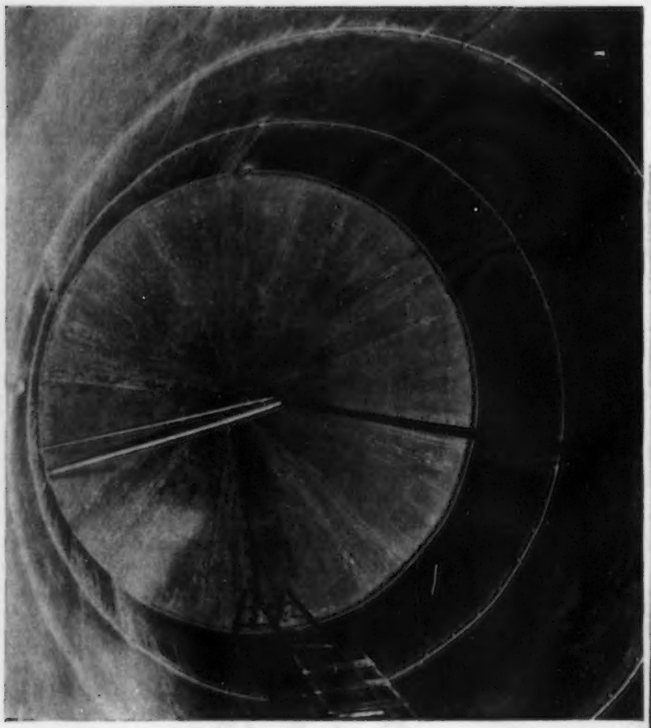
The nickel-clad steel used is a joint development of the International Nickel Co., New York, and the Lukens Steel Co., Coatesville, Pa. The material used was produced by the hot rolling and bending of a light layer of pure, solid nickel and a heavier layer of steel. The bond of the nickel layer to the steel base is obtained through thermal diffusion which forms a solid solution alloy at the interface, and there is no separation of the layers under normal conditions of temperature changes, pressure, vacuum, or mechanical shock. It is said that the material can be sheared, bent, flanged, welded, or riveted without cracking or peeling.

Molding Machine Having Guide Rod Design

THE Tabor Mfg. Co., Philadelphia, announces the Tabor semi-shockless-jar, and trunnion rollover, gravity draw molding machine shown on page 32.

It is built in three sizes, with 13-in., 15-in. and 18-in. squeeze cylinders. The 15-in. size has a table 33 in. by 16 in., a squeezing cylinder 15-in. diameter and a jarring capacity of 500 lb. No pit is required for installation. The jarring head, which also is a cross-head carrying bushings at either end, is rigidly mounted on the squeezing piston. The bushings are over six diameters of guide on 2-in. fixed guide rods, and, it is said, are ample to guarantee a perfect draw. Because the bushings, the cross-head, and the squeezing piston are rigidly attached to each other, the effective guide equals a distance from the top of the bushings to the bottom of the squeezing piston, a distance of 19 in. The guide is uniform in all positions and is constant throughout the travel of the machine.

The table must be lifted free of the trunnions before jarring. This is done by the squeezing piston which is automatically held against fixed stops at the proper height. The jarring machine is supported on air during the jar. There is no downward shock on the floor. The only shock is the slight recoil of the jarring head against the stops and this is upward rather than downward and, it is said, is not of serious consequence. Quick-acting, air-operated flask clamps are employed. The table rolls on rollers, rather than on bearings. After the mold is drawn, it is automatically placed on rollers to facilitate the removal of the flasks. These rollers are easily lifted off when not needed.

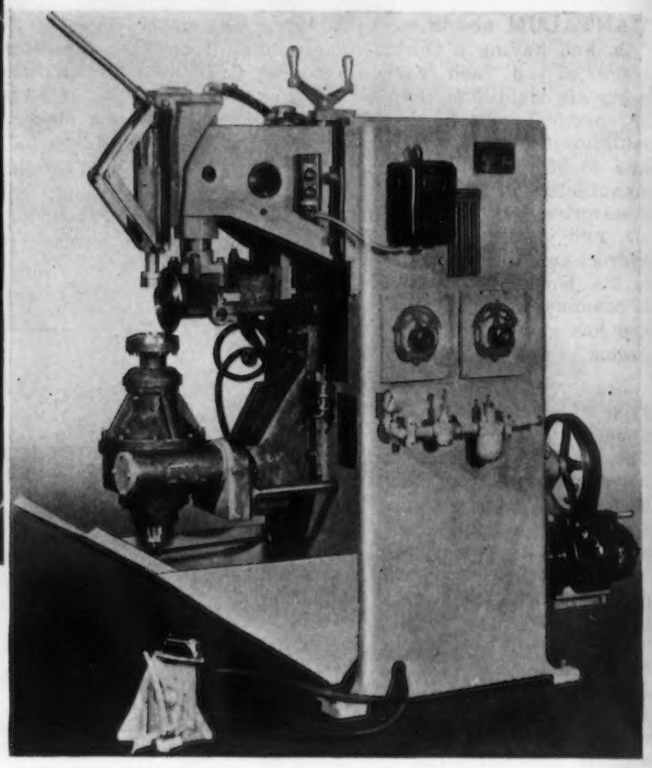


ABOVE

NICKEL-clad steel is employed in the fabrication of this soap kettle, which is described at length on page 31. The overall height is 29 ft. The diameter is 15 ft. The four courses below the butterfly top point to the bottom cone which is 7 ft. high.

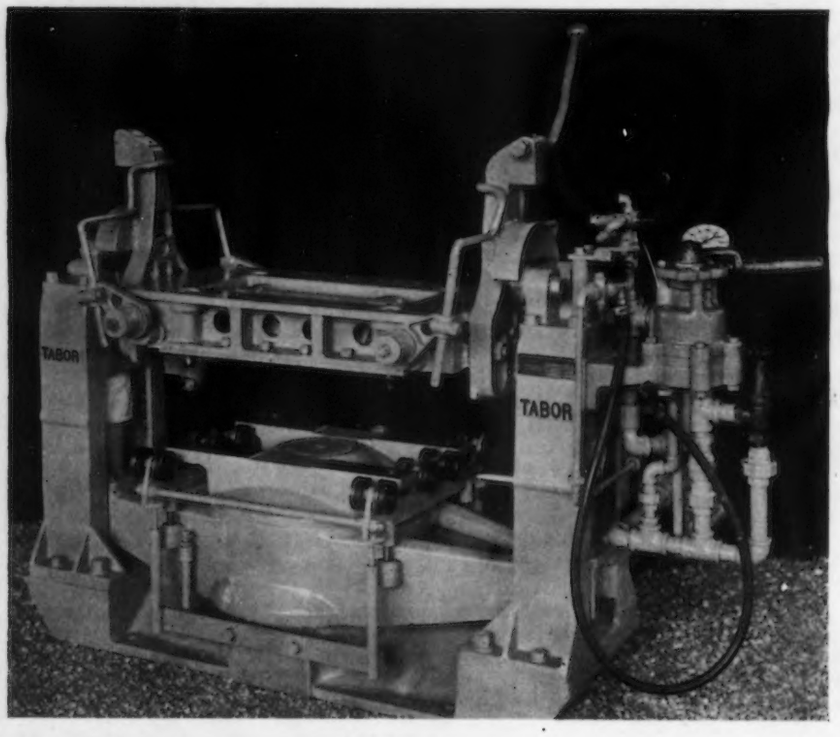
BELOW

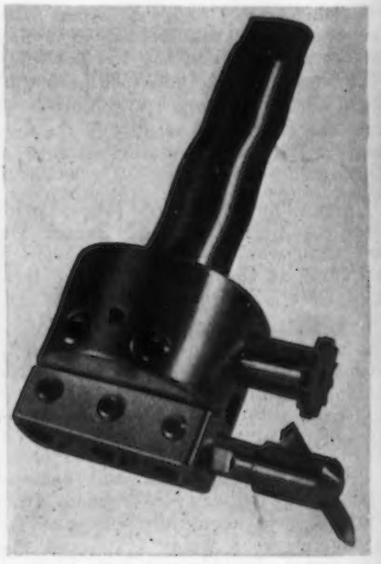
THE compression headers of electric refrigerators are being assembled by seam welding as described on page 31. In the equipment used the lower roll is worm driven and the welding speed is controlled by a Reeves pulley.



BELOW

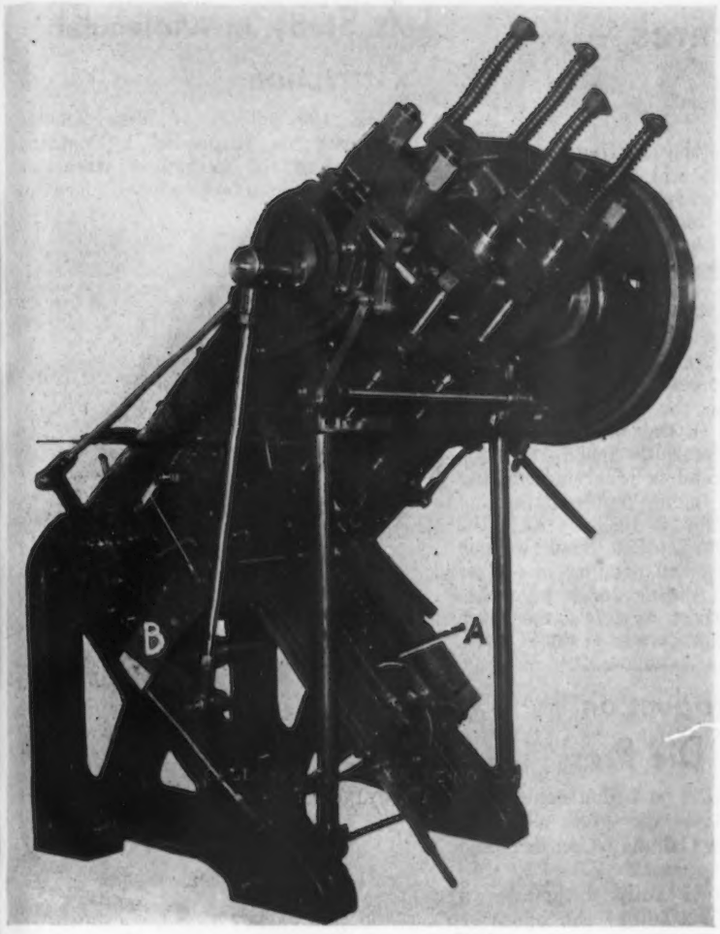
NO pit is required for the installation of this new Tabor molding machine. A jarring capacity of 500 lb. is specified for the 15-in. model. Other features of the equipment are outlined on page 31.





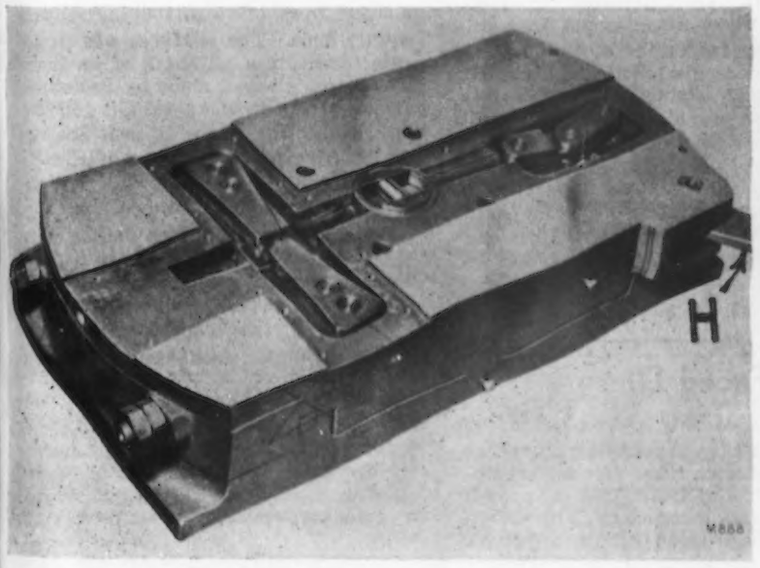
ABOVE

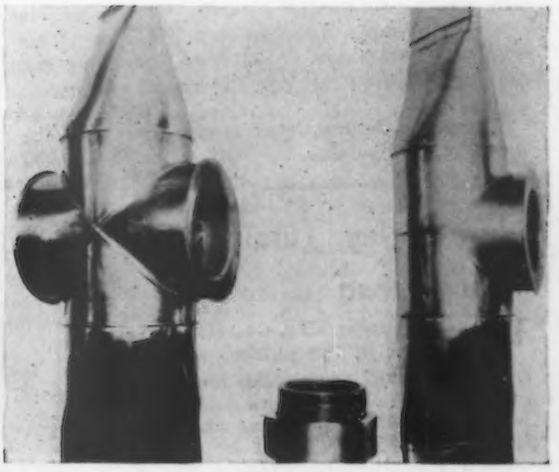
THIS new boring head can be used for facing and turning as well as for boring. The head revolves. The stock remains stationary. A graduated barrel adjusting screw has a star wheel which permits of adjustments while head is running. See page 34.



AT LEFT

FEEDING of individual sheets from a batch and the chuting of finished product from the machine feature this multiple die press. The production of bottle caps and similar articles exceeds 1500 pieces per minute. See page 34.





ABOVE

PROCEDURE followed in the arc welding of tantalum sheets, 0.005 in. thick, is given on page 31. Precautionary measures, because of several specified factors, are suggested as a result of experience in production.

ABOVE AND AT RIGHT

DETAILS of this Sundstrand index base, offered for use singly, in pairs or for mounting multiple fixtures, are given on page 34. The principal operating parts are the same in each case. Type of indexing power is optional.

Sundstrand Index Base Features Range of Utility

ILLUSTRATIONS on page 33 show each a positioned and an inverted view of a new index base by the Sundstrand Machine Tool Co., Rockford, Ill. The operating lever "H," shown in the positioned cut, and the clamping segment can be furnished in reversed position to permit use of the base in pairs.

The inverted position view pictures the operating toggle and roller and permits of operating examination as follows: movement of the lever "H" releases a segment grip and thereby, under the influence of spring, slightly raises the upper part of the base and the roller, allowing it to be freely turned around the large center stud.

Indexing is facilitated by ball thrust bearing and a flat sided detent which enables the operator to aline the upper base member accurately with the index bar.

Six sizes, ranging from 325 lb. (12 in. by 24 in.) to 700 lb. (20 in. by 30 in.) are available. Extensions on each side of the upper part or table, serve as chip guards, when required by the nature of the work. The units and index bar members within the base are hardened and ground.

Special designs, made up largely of standard parts, can be supplied for the use of several holding fixtures at a time.

Automatic, hydraulic or pneumatic indexing is available.

New Boring, Turning and Facing Head

THE C. C. Craley Mfg. Co., Shillington, Pa., is in the market with a new Craley boring, turning and facing head, which will bore and face work up to 13-in. diameter and will turn the outside of studs or bosses up to 4½-in. diameter. It is designed for use on milling, boring and drilling machines, where the work remains stationary. Illustration on page 32.

The head is 4-in. diameter steel and is 2⅜ in. long; the sliding block is made of oil hardening steel, properly tempered; block is 4 in. long, 1½ in. wide, 2¼ in. deep and has four openings, ¾ in. diameter, to receive the boring and turning tools. Three of these openings are arranged in the front end of the block; each of the openings are the full depth of block 2½ in. Tools are held with three socket head screws. The center opening will run true with the shank when set flush with head, and the graduated screw reads zero. The fourth opening is at right angle, the entire length of block. The bearing is of dove-tail type, fitted to head without any gib. The tension screws are arranged so that all of the cutting strain is against solid metal, regardless of the direction of travel, or the amount of use the head has had. By adjusting these socket head screws, pressure is brought to bear against the brass angle pieces that keep the desired tension on sliding block, or for securely locking same in any location. The adjusting screw is of oil-hardening steel tempered, ⅝-in. diameter, 40 threads to the inch. The barrel is graduated in thousandths and has a star wheel on outer end for adjustment while head is revolving, during such work as facing, undercutting and back facing, or it may be adjusted by hand with socket head wrench placed in broached opening in end of star wheel. Sliding block has 1-in. adjustment right or left hand from zero, for either power or hand feed.

Rapid Production Multiple Die Press

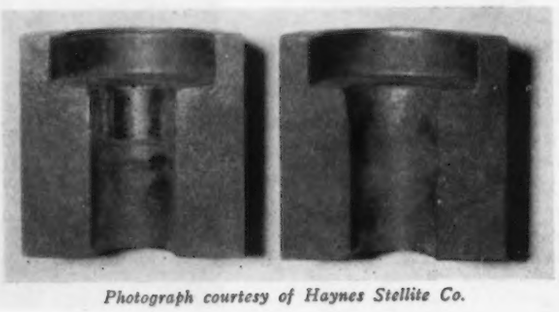
AN improved model of a double-acting multiple die press is being offered by the Callahan Can Machine Co., Inc., Brooklyn, N. Y.

This press is fully automatic in operation. In loading, the operator places a batch of tin plate, usually lithographed, in the magazine shown at "A" in the illustration on page 33. One sheet at a time is then automatically fed to the dies. The finished work is ejected through chutes, one of which is shown at "B." Safety devices are provided against the feeding of more than one sheet at a time. Emergency stops also are a part of the equipment. Sixteen dies are supplied. Articles such as bottle caps are said to be timed at 1520 per minute.

The press is driven by a 7½ hp. motor at 95 r.p.m.

Hard-Faced Dies

HARD-FACING protects dies from wear. Notice the difference in wear between these dies for hot upsetting cluster gears for a prominent make of automobile. The die on the left, hard-faced with non-ferrous cobalt-chromium-tungsten alloy, is still straight after completing 18,000 forgings, whereas the plain steel die on the right is badly bell-mouthed and unfit for further service after only 7000 forgings. Although expansion and contraction due to heat has slightly checked the hard-faced die, it can be quickly and easily reconditioned by simply melting together the hard-facing deposit and adding a little more wear-resistant alloy, after which a grinding operation completes the job.



Photograph courtesy of Haynes Stellite Co.

A Study in Molecular Attraction

THE 105 pounds of Miss Alberta Kaesser is suspended by nothing more than the molecular attraction between the surfaces of two pieces of highly polished optical glass, so accurately flat that they will resist a separating force of 95 to 100 pounds per square inch. The surfaces are accurate to within a millionth of an inch. These test glasses, made by Bausch & Lomb, are part of an exhibit for the annual meeting of the Optical Society of America at the Bureau of Standards, Washington, D. C.

THE NEWS OF THE WEEK

British Steel Industry Benefits From Construction and Railroad Orders

LONDON, ENGLAND, Dec. 10 (*By Cable*).—Pig iron output is high, but business is limited to day-to-day parcels for prompt delivery. Little forward buying is expected until after holidays. Northeast Coast pig iron production in October was the highest since March, 1930. Exports are expanding with shipments to Italy, Norway, Germany, Argentina and Denmark. Home demand for hematite is maintained.

The steel combine's output for its own consumption is substantial. Good orders have been taken for construction materials and large home railway orders have been placed with more expected. Exports have diminished.

Home business in tin plate is considerable and deliveries are satisfactory. Export demand is dull.

Pronounced seasonal inactivity characterizes the Continental iron and steel market, and slack export business is causing some anxiety. Far Eastern, Japanese and Manchurian demand is particularly disappointing.

The increase in Far Eastern freight rates on Feb. 1 is to be deducted from f.o.b. prices in the case of Japan and Manchuria, but added for Siam, the Straits Settlements and China.

The International Wire Export Co. reports light demand and keen outside competition.

Exploratory discussions in London last week among representatives of British Iron and Steel Federation and International Raw Steel Cartel are expected to develop a cooperative policy, but no conclusions were reached as British want Continental imports limited to 600,000 tons annually.

Luxemburg is to float an unemployment relief loan of 100,000,000 francs mainly for iron and steel industry.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9	
Billets, open-hrth.	£5 10s.	to £5 15s.
Tin plate, per base box	*18s.	2d.
Steel bars, open-hearth	£7	17½s.
Beams, open-hrth.	£7	7½s.
Channels, open-hearth	£7	12½s.
Angles, open-hearth	£7	7½s.
Black sheets, No. 24 gage	£9	5s.
Galvanized sheets, No. 24 gage	£11	5s.

*To March 1; 18s. 5d. thereafter.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange

Billets, Thomas	£2	7s.	
Wire rods, No. 5 B.W.G.	£4	10s.	
Steel bars, merchant	£3	5s.	
Sheet bars	£2	8s.	
Plate, ¼ in. and up	£4		
Plate, 3/16 in. and 5 mm	£4	2s,	6d.
Sheets, ⅛ in.	£4	7s.	6d.
Beams, Thomas	£3	2s.	6d.
Angles (Basic)	£3	2s.	6d.
Hoops and strip base	£4	2s.	6d.
Wire, plain, No. 8	£5	7s.	6d.
Wire nails	£5	15s.	
Wire, barbed, 4-pt. No. 10 B.W.G.	£8	15s.	

Mining Industry Offers Employment Relief Plan

A SEVEN-FOLD plan by which the mining industry may be brought into play as a means of reviving employment has been outlined by a special committee of the American Mining Congress. In a progress report, the committee brought current preparation of the Federal budget into the picture by stressing the fact that cuts in Bureau of Mines funds are directly preventing the mining industry from contributing its full force to recovery.

"The committee urges advancement of the following activities," the report states, "through sufficient restoration of funds cuts during recent years from Bureau of Mines appropriations":

1. Technological efforts to promote use of domestic deposits of essential minerals which now are imported in large quantities.

2. Development of information and technological methods to bring fullest possible production of gold in the United States.

3. Provision of a national inventory of known reserves of essential minerals and extension of conservation and economic use of those minerals.

4. Establishment of the Bureau of Mines as procurer and distributor of all mining information for Governmental agencies, including "new deal" units as well as "old line" organizations.

5. Extension of research and development work relating to minerals essential to national defense.

6. Expansion of the Bureau's ability to aid mining operations by impartial clearance of information to the mining industry and to industries which use minerals as raw materials.

7. Restoration, to its former extent, of the training of miners in first-aid and mine-rescue methods."

Bissett Steel Co. Sets Up Tool Division

THE tungsten carbide die, tool and specialty department of the Bissett Steel Co., Cleveland, has been reorganized and will henceforth be operated as a separate corporation named Tungsten Electric Corpn., Bissett Steel Division. Manufacturing and sales will be handled by the same personnel as before the change, with the increases required by the broader scope of the new company, with executive offices and main manufacturing plant in Cleveland. A branch manufacturing plant has been built in Chicago, and is now in operation, and later additional branches will be built in other cities requiring local

manufacturing service. The Bissett Steel Co. branch warehouse in Cincinnati will be used for the present as the Cincinnati headquarters of the new corporation.

Steel Construction Group Announces 1935 Plans

THE American Institute of Steel Construction, New York, in preparing its program for 1935, is determined to make an aggressive fight for such reforms as are possible within and without the industry. The plans, according to V. G. Iden, promise to be more effective than in the past year and involve the following main features:

To stabilize operating conditions within the industry so that it can better stimulate work and spread employment.

To insure to structural steel its proper consideration in all public projects designed to stimulate and improve business.

To improve marketing conditions through proper representation before the Government, and before the mills and other trade organizations whose interests are involved with the interests of the fabricator.

To standardize the product and engineering practices and promote the universal and rational utilization of structural steel in buildings, bridges and other steel structures.

To stimulate the interest of architects and engineers as well as owners in the building of structures in steel, through such legitimate channels of advertising and promotion as are available to a national organization.

To maintain an organization which, by cooperating with the producers of the plain material, can more effectively extend the markets and increase the tonnage of steel to be rolled and fabricated.

Scrap Up at Detroit

DETROIT, Dec. 11.—Pressure from outside markets has forced up scrap prices here 50c. to $1 a ton. Dealers are bidding much higher than they did a week ago in order to keep the available supply of old material from going into other districts. Heavy melting steel and hydraulic bundles are among the items which have advanced $1, despite the fact that no new orders have been placed by local mills. The volume of scrap being produced in southern Michigan has increased considerably. Briggs Mfg. Co., for instance, has sold in the open market the first scrap it has offered in eight or nine months. This scrap originated from production of bodies for various Chrysler divisions, particularly Plymouth.

Steel Corporation's November Shipments Show Slight Gain at 366,119 Tons

THE United States Steel Corpn.'s November shipments of steel products rose slightly over the October level, having totaled 366,119 tons, compared with 343,962 tons in the preceding month and with 430,358 tons in November, 1933. Last month's movement was sufficient to engage the Corporation's totaled finished steel capacity at 22.9 per cent, compared with 20.6 per cent in October and 23 per cent in September.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORPN.

				1933		1934	
Month	1930	1931	1932	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity
January	1,104,168	800,031	426,271	285,138	17.7	331,777	19.8
February	1,141,912	762,522	413,001	275,929	18.5	385,500	26.3
March	1,240,171	907,251	388,579	256,793	15.3	588,209	36.6
April	1,188,456	878,558	395,091	335,321	21.6	643,009	41.5
May	1,203,916	764,178	338,202	455,302	27.1	745,063	44.4
June	984,739	653,104	324,746	603,937	37.4	985,337	61.2
July	946,745	593,900	272,448	701,322	45.1	369,938	23.0
August	947,402	573,372	291,688	668,155	39.8	378,023	23.1
September	867,282	486,928	316,019	575,161	35.6	370,306	23.0
October	784,648	476,032	310,007	572,897	35.5	343,962	20.6
November	676,016	435,697	275,594	430,358	26.7	366,119	22.9
December	579,098	351,211	227,576	600,639	38.7	.....	...
Plus yearly adjustment	(40,259)	(6,040)	(5,160)	(44,283)	...	.....	...
Total for year	11,624,294	7,676,744	3,974,062	5,805,235	30.1	.....	...

November Trackwork Shipments Heavier

NOVEMBER shipments of trackwork for tee rail track of 60 lb. a yd. and heavier amounted to 2212 net tons, according to the American Iron and Steel Institute, compared with 2153 tons in the preceding month and with 3087 tons in November, 1933.

Ryerson Enlarges Milwaukee Plant

JOSEPH T. RYERSON & SON, INC., is now completing an extension to its Milwaukee plant at 244 South Nineteenth Street, which will almost double the former warehousing capacity at that point.

The plant proper has been extended to almost twice its former length. A section of the old warehouse has been insulated and equipped with a new central heating system for the storage of special steels. A two-story modern brick office building with sound-deadening ceiling and other improvements has also been erected.

The new heating system will provide proper distribution of heat to prevent any condensation of atmospheric moisture from spoiling the quality and finish of the special sheets, cold-finished bars, tool and alloy steels, etc., that are being added to stocks. Many new sizes of structural steels, bars, plates and heavy sections are also included.

Copper Research Group Drops Mining Members

AT a reorganization meeting of the Copper & Brass Research Association, 25 Broadway, New York, the mining companies withdrew and the fabricating members formulated plans for a promotional campaign for the forthcoming year.

The following officers were elected: president, F. S. Chase, president, Chase Brass & Copper Co.; vice-presidents: John A. Coe, president, American Brass Co.; C. D. Dallas, president, Revere Copper and Brass, Inc.; Wylie Brown, president, Phelps, Dodge Copper Products Corpn.; treasurer, C. T. Ulrich, vice-president and treasurer, Kennecott Copper Corpn., and secretary, B. B. Caddle.

Manufacturers Ask for Extension of Recovery Act

Revisions Sought with Codes Limited Only to Industries Which Desire Them—Full Cooperation with Government Urged in Resolution

THAT industry desires the extension of the National Industrial Recovery Act for at least another year was indicated by a recommendation made at a meeting of the Congress of American Industry, sponsored by the National Association of Manufacturers, which was held in New York last week. While the recommendation asked for the abandonment of some features of the act which have been detrimental to business, it sought the continuance of many others and specifically favored the retention of codes of fair competition by those industries which desire them.

While the Congress approved generally the proposed platform for national recovery originally submitted to it and published in THE IRON AGE, Dec. 6, page 57, some changes were made as the result of thorough discussion on the floor of the meeting. A particularly important change was the elimination of all reference to a Federal sales tax, which had occurred in the original platform.

Following the adoption of the final recovery platform, Robert L. Lund, St. Louis, chairman of the board of the association, was appointed to head a special committee to work out with other representative organizations a program for recovery consistent with the platform. Uppermost in such a a program will be the promotion of recovery by the reemployment of labor and capital in private enterprise "as the only sure road to security, stability and progress." At the same time the convention definitely went on record in the belief that recovery and reemployment should not be subordinated to reform.

Administration Policies Expounded

The meeting was given a somewhat official stamp by the appearance as speakers of Donald R. Richberg, director, National Emergency Council; Daniel C. Roper, Secretary of Commerce, and Raymond E. Moley, editor of *Today*, and close friend and adviser of President Roosevelt. All were more or less conciliatory to business and industry in their utterances. Mr. Richberg, in effect, urged business to go ahead without fear in a continuation of recovery.

Secretary Roper was particularly encouraging. In stressing the need for cooperation between industry and the Government in a common program, he suggested the following objectives: Return of relief responsibilities to State and local governments; planning of a sound public works program; a practical plan of unemployment insurance; reopening of our export markets; recommendations looking to the preservation of the desirable features of the NRA, and the reemployment of capital. Mr. Roper said that he solicited the suggestions and recommendation of business men in solving current problems. But, he continued, "it is not the job of business only to say what is wrong. It must suggest concretely and specifically what is right."

Resents Further Government Control

The convention went on record as favoring resistance by the Administration to any effort to continue or intensify control of Government over industry, "beyond measures required to insure the effective maintenance of fair, free and open competition and to conserve the natural resources of the nation. Business enterprise," its statement continued, "has been developed progressively through self-initiative, ingenuity, practical application of inventions, improvement of technique, mass production, increased efficiency of management and the skill of its workers. The relatively high standard of living of the average American worker is largely attributable to these factors. Every legislative act which undertakes to improve the well-being of the wage earner or business man should recognize and encourage the operation of these essential forces of American business."

Revisions in NIRA

The proposals made for the revision and continuation of the National Industrial Recovery Act are covered in the following recommendation:

By its own terms the National Industrial Recovery Act expires not later than June 16, 1935. Prior to its expiration it is recommended that Congress enact, for a period of one year from the expiry date of the act as an opportunity for further trial, new emergency legislation in order that those functions of the act which have proven worthy of further trial may be continued permitting such continued trial by industries which is desired, but without burdening other industries which do not wish such trial.

Such legislation should be administered by an independent administrative court of five members possessing the authority to approve or disapprove codes of fair trade practices in interstate commerce that had been voluntarily submitted by a truly representative majority of a given group, trade or industry.

Labor Provisions

The new act should require every code of fair competition to contain suitable provisions concerning hours and wages, prohibiting child labor, safeguarding both labor and employer by giving to labor the right to deal with employers either individually or collectively or through representatives of their own free choice without intimidation or coercion of either party from any source.

Fair Trade Practice Provisions

It is recommended that the new legislation permit any industry, trade or other representative group voluntarily desiring to do so, to adopt and make effective under Governmental regulation and after proper investigation in public hearings a code of fair competitive practices containing prohibition of unfair practices and permitting, if desired, provision for publicity of prices. This would prevent competitive practices that are destructive of the welfare of industry and its employees and that are ultimately injurious to the public interest, and permit competitive practices most certain to assure the welfare of industry, its employees and the public.

The standard or rule by which the administrative court would be guided in rendering decisions on fair trade practices should be established by Congress. It should prohibit injurious and destructive acts of competition. It should prescribe limitations on competitive practices enforceable within the group in order to preserve the fair competition sought. Such legislation should declare and enforce prohibition against marketing agreements, limitation of output, fixing of prices or other practices which might become oppressive to small enterprises, except as hereinbefore stated and as they are determined, by the administrative court, to be in the public interest, and are carried on by such industries under adequate Governmental supervision. The act should be limited in its application to those industries that are engaged in or directly affect competition in interstate commerce.

Codes Voluntary

The development and submission of such codes of fair practice should be voluntary on the part of industry and subject to approval or disapproval by the administrative court, with opportunities for resubmission on modification

to the same authority. The writing of the code in whole or part by the administrative court should not be permitted, but that privilege and duty should be placed solely upon the petitioning industry. An approved code should likewise place upon the industry the primary obligation of policing enforcement, with the aid, on proof of violation, of the administrative court and ultimately through a judicial order.

Under appropriate safeguards the approved competitive practices and prohibitions submitted by the properly defined majority of a group, trade or industry should be binding upon the minority. A minority group, in the absence of a majority request, should likewise be authorized to request a code of its own, limited in effect to its own members and to a period that would automatically terminate when a majority of the industry began to operate under an approved code. No trade, group or industry should be required to submit or request a code, the entire action being voluntary and influenced only by the desire of a trade, group or industry to avail itself of the opportunity afforded under the law. Such action should not be influenced by boycott or threat of boycott or by extra legal process, nor should Government limit its buying in any way to codified groups or industries. Those industries or groups not submitting a code would continue to operate under the anti-trust acts.

Present Codes Should Continue Until Replaced

To prevent confusion in the transition period between the expiration of the National Industrial Recovery Act and the development of codes under this plan, the provisions of an existing code, unless objected to by a preponderant majority of an industry, should be continued in effect until the administrative court, after hearing, had opportunity to approve or disapprove of these provisions in whole or part; or until the industry had obtained a new code or a modification of the old code. Existing codes would thus continue in effect without interruption until withdrawn either by the industry or by the administrative court after hearing. Industries not desiring to operate under existing codes would so notify the administrative court, whereupon such codes would be terminated.

In some natural resources industries, conservation is a matter of great public concern and may require specific treatment. These industries should be able to utilize such provisions of general legislation as outlined herein; but since those provisions may not be sufficient to meet the needs of the industries, and for the protection of the public interest, specific legislation should be considered to meet their requirements. Such legislation should follow the general principle that the greater the privileges extended, and the more nearly the results approach or tend toward monopoly, the greater the Governmental supervision that is necessary to protect the public interest.

If upon trial such legislation should prove beneficial to industry and labor and in the public interest Congress could consider making it permanent prior to its expiry date.

It is recognized by employers, employees and the Government that the establishment of codes of fair competition, especially by the voluntary act of competitors acting in unison, is in certain industries desirable and in the public interest. The suggested plan would provide a means of securing, with a minimum of executive enforcement, the free and effective cooperation of industry and Government.

The principle and policy of this plan would be workable and would represent a practical method of establishing a desirable transition from abnormal, highly centralized control of competitive practices to the normal and orderly method through which a free people in its own interest authorizes its private enterprises to demonstrate by voluntary action their capacity for self-organization, and self-control and self-enforcement of that control in the light of their experiences.

Mr. Bardo Continued as President

C. L. Bardo, former president, New York Shipbuilding Corpn., Camden, N. J., was reelected president of the National Association of Manufacturers for the ensuing year, and Robert L. Lund, executive vice-president, Lambert Pharmacal Co., St. Louis, was elected to his second term as chairman of the board; George H. Houston, president, Baldwin Locomotive Works, Philadelphia, and Charles R. Hook, president, the American Rolling Mill Co., Middletown, Ohio, were reelected vice-presidents.

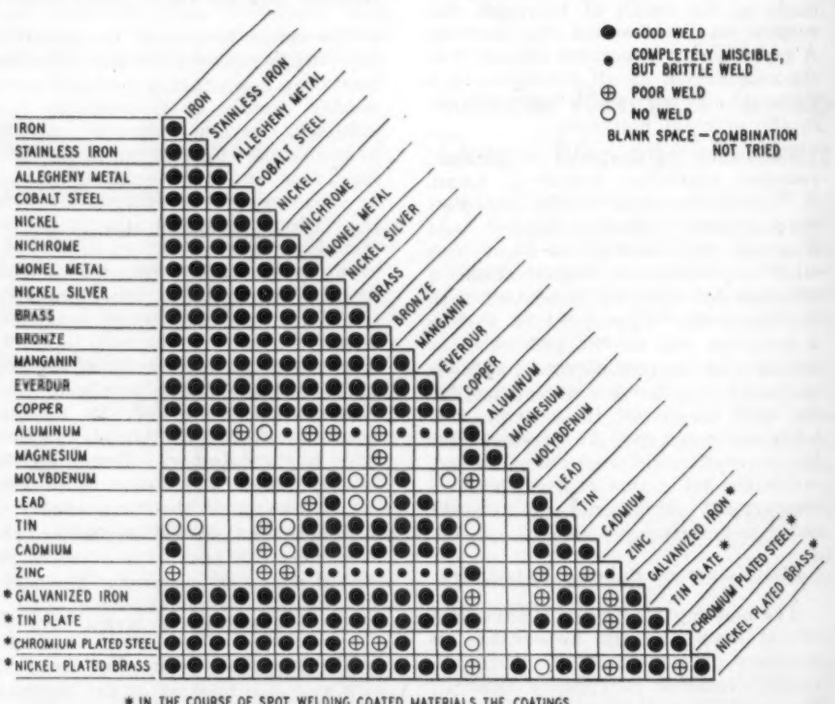
The following new vice-presidents were also named: F. W. Lovejoy, president, Eastman Kodak Co., Rochester, N. Y.; Walter J. Kohler, president, Kohler Co., Kohler, Wis.; F. H. Willard, president, Graton & Knight, Worcester, Mass.; H. M. Bullis, vice-president, General Mills, Minneapolis; W. T. Holliday, president, Standard Oil Co. of Ohio, Cleveland; C. S. Davis, president, Borg-Warner Corpn., Chicago; S. Bayard Colgate, president, Colgate-Palmolive-Peet Co., Jersey City, N. J., and Robert B. Henderson, president, Pacific Portland Cement Co., San Francisco.

The officers constitute the executive committee, with W. R. Webster, chairman, Bridgeport Brass Co., Bridgeport, Conn.; George McNeir, chairman, Mohawk Carpet Mills, New York; W. Gibson Carey, Jr., president, the Yale & Towne Mfg Co., New York, and Malcolm Muir, president, McGraw-Hill Publishing Co., Inc., New York.

Republic Installing New Pipe Finishing Equipment

REPUBLIC STEEL CORPN. is installing additional finishing equipment in its Youngstown electric weld tube mills and erecting a new building in which to house the equipment and provide additional space for finished pipe. The new equipment and building will cost about $500,000.

Interlake Steamship Co., Cleveland, at a special meeting of directors, decided to use $1,600,000 of the company's liquid funds in the purchase of its capital stock from shareholders. The funds thus to be used were accumulated for fleet modernization and new vessel construction. However, as there appears to be no need of new construction in the near future the directors decided to use the accumulated funds to purchase stock.



* IN THE COURSE OF SPOT WELDING COATED MATERIALS, THE COATINGS FREQUENTLY DISSOLVE IN THE OTHER METALS PRESENT OR BURN AWAY

CHARACTERISTICS of spot welding of some 250 combinations of metals. This study was made by Lawrence Furguson of the Bell Telephone Laboratories, Inc. As in spot welding of steel, an essential detail is the choice of a suitable electrode tip. For welding high resistance materials such as iron, nickel, nichrome, and nickel-silver, electrode tips of copper are suitable. Where greater strength or longer life is required, however, a copper rich copper-tungsten alloy is advisable. For low resistance materials such as copper or aluminum, tungsten tips are the best as they do not easily alloy or weld at ordinary welding temperatures.

THE WEEK IN WASHINGTON

Steel Industry's Attitude on Collective Bargaining Indicated in Carnegie Cases

WASHINGTON, Dec. 11.—Formal notice that it will receive and negotiate with members of any organzation as such, as representatives of employees belonging to that body, was filed by the Carnegie Steel Co. through R. E. Desvernine, its attorney, at a hearing last week before the National Steel Labor Relations Board. Joining the company in its position was the Employee Representatives' General Body Committee.

In connection with the petition of the Amalgamated Association of Iron, Steel and Tin Workers for a collective bargaining election at the McDonald, Ohio, plant of the company, the employee representatives, through their attorney, Edmund L. Jones, filed a statement which said that in view of the Carnegie proposal "there is no basis upon which logically or legally election can be ordered at this plant." The statement, signed by Mr. Jones, Frank J. Hogan and Joseph J. Cotter, pointed out that the reasons holding that no election can be ordered were set forth in a brief the employee representatives' counsel had filed with the board in the matter of the Gary works of Illinois Steel Co.

A like position was taken by the employee representatives in the case of the Duquesne, Pa., plant of the Carnegie Co., which was also considered at the hearing presided over by Judge W. P. Stacy, chairman of the board, and at which Admiral Henry M. Wiley also sat. The hearing was held for the purpose of taking additional evidence on the character of the Carnegie company's business at its McDonald and Duquesne plants.

Notice by the company that it will negotiate with members of any organization as representatives of that body's members but would not sign term contracts reflected formally the attitude of the iron and steel industry. Following the appeal of President Roosevelt for a capital-labor truce, the industry indicated that it would recognize and deal with officials of the Amalgamated Association of Iron, Steel and Tin Workers but would not deny to other groups of workers the right to deal with employers. William Green later held a conference with M. F. Tighe, president of the association, after which the former announced that the proposal was not acceptable. It is reported that the association officials were agreeable to the plan.

In maintaining that so far as employees' work is concerned, it is intrastate in character, L. H. Burnett, vice-president, Carnegie Steel Co., said that although the products of the company are in some cases shipped to other States, employees are in no way connected with the handling of the company's products except within the confines of the Duquesne and McDonald plants. A memorandum regarding the intrastate character of work done at the Duquesne plant filed by the company declared that the controversy before the board "does not relate in any wise to the general business of the company or in fact to the employees of the company generally but is confined solely and exclusively to the employees of a single plant."

The company filed amended appearances in both the McDonald and Duquesne cases. They embraced the statement of its willingness to negotiate with members of any organization and again denied the jurisdiction of the board. Denial of jurisdiction was made on the grounds: (1) That the "company has not refused to meet and collectively bargain with any of its employees or any group of its employees or their representatives"; (2) that no individual employees of the company appear as petitioners; (3) that an election was held last June for the purpose of selecting collective bargaining representatives and that "there is no dispute or controversy requiring any further election." In the McDonald case the company declared that the McDonald plant constitutes but one unit of an integrated plant which includes three other units.

In reply to a question by Charlton Ogburn, attorney for the Amalgamated association, Mr. Burnett said that sales of the company made to the Chevrolet Motor Co. in Detroit were made in Pittsburgh and that the orders were formally accepted there. This point was brought out as an answer to a statement by William J. Spang, president, Fort Duquesne Lodge, who testified as to sales to the Chevrolet Motor Co., and sought to establish their interstate character.

Mr. Burnett said that notice of shipments to the Chevrolet company was given to the Western representative of the Carnegie company in Detroit but that the bill of lading was made out to the Chevrolet company. Judge Stacy asked Mr. Burnett regarding the payment of taxes by the Carnegie company to Pennsylvania and other political units. Mr. Burnett stated that the company pays a capital stock tax in Pennsylvania on that part of capital not directly engaged in manufacture, taxes being paid on portions of land not used for manufacturing.

Additional Machinery Awards by Army

WASHINGTON, Dec. 11. — Machine tool awards made by the Army Ordnance Department so far have aggregated $557,715 out of the total $2,300,000 PWA fund. Among the awards made since those announced in the IRON AGE last week are the following: LaPointe Machine Tool Co., one horizontal hydraulic broaching machine, $3,945; Leland-Gifford Co., two double-spindle sensitive drilling machines, $4,577; Steadfast & Roulston, Inc., one keystone machine, $1,720; Gisholt Machine Co., one turret lathe, $8,030; Warner & Swasey Co., one turret lathe, $10,416; W. W. Shipley Machinery Co., one screw-cutting bench lathe, $1,962; Pratt & Whitney Co., one thread miller, $5,998; Hutto Engineering Co., one hydraulically reciprocated horizontal honing and lapping machine, $15,960; Lloyd & Arms Co., one hydraulically reciprocated honing and lapping machine, $10,220.

Steel Companies Object to Higher Freight Rates on Raw Materials

WASHINGTON, Dec. 11.—While iron and steel interests presented some objections to higher rates on their manufactured products, their chief protests at hearings in the proposed general rail freight rate advance case were directed against a boost in rates on raw materials. The carriers propose an increase of 10 per cent on both raw and manufactured products of the steel industry. Only a few appearances were made on behalf of the industry, and were presented toward the close of the hearings.

A comparatively early decision is expected to be reached by the Interstate Commerce Commission. It is the general view that some increases will be granted. Hearings, which were held in different sections of the country, were completed in Washington last week and were in charge of Commissioner Clyde B. Atchison. Arguments have been set for Jan. 9. Carrier briefs are to be filed by Jan. 4 and reply briefs by Jan. 24.

R. K. Boggs, purchasing agent for the Andrews Steel Co., the Newport Rolling Mill Co., and the Globe Iron Roofing & Corrugating Co., Newport, Ky., declared that the proposed increases would place a tremendous, if not a prohibitive burden, upon these companies. Declaring that the advances would add 60c. a ton to the costs of steel producers, Mr. Boggs said this would mean an annual increase of $241,312 when the mills were operating at full capacity and about $90,000 on the basis of present operations.

Appearing for the Republic Steel Corpn., Youngstown, R. A. Eldridge argued against increased rates on iron ore, while W. H. Welsh expressed opposition to advances in rates on ex-river coal to plants of steel companies in the Youngstown district and to increased rates on limestone. Mr. Welsh said that, if rate increases on ex-river coal are granted, the disadvantage of Youngstown district mills in competing with plants in the Pittsburgh district which are able to use coal shipped and delivered by water and therefore not given higher rates will be heightened. In such an event, Youngstown mills would have to find a way to get coal without paying the higher rail rates.

Coal Rates Protested

A. H. Brown, representing the Cleveland Chamber of Commerce, protested broken relationships on coal, iron ore and class rates. Thomas F. Rahillt, representing the Algoma Steel Corpn., Sault Ste. Marie, Ont., opposed increased rates on Lake cargo coal.

Protest was made by John B. Keller, Koppers Co., Pittsburgh, against increases on iron ore being made in such a way as to change the relationship of rates as between Lake front and interior blast furnaces. He maintained that each of the two groups of furnaces should bear a like increase if advances are ordered. E. E. Williamson, appearing for the Providence Gas Co., Providence, R. I., opposed increased rates on by-product coke.

F. M. Russell, General Fireproofing Co., Youngstown, maker of office furniture, was joined by other shippers in opposing increased class rates for short distances without a relative increase on short hauls in the higher classes.

Rates on Tin Plate Scrap

Opposition to increased rates on tin plate scrap was offered by W. J. Buttfield, president, Vulcan Detinning Co., which has plants at Sewaren, N. J., and Neville Island, Pa. The Sewaren plant, with an annual capacity of 80,000 tons is closed, while the Neville Island plant, with a capacity of 120,000 tons, was said to be operating at considerably less than 50 per cent of capacity.

Mr. Buttfield pointed out that detinning of tin plate scrap is a costly operation and must be conducted on a large scale to be profitable; that prices for metallic tin and tin tetrachloride are controlled by the world's market price of pig tin and that the detinned scrap price is controlled by that of heavy melting scrap. Citing these conditions to show that prices of products of detinning are controlled entirely by influences outside of the detinning industry, Mr. Buttfield said that any increase in freight rates cannot be added to the price of the detinned products and passed on to the consumer but must be absorbed by the detinning companies.

He declared that, with the diminished supply of tin plate scrap and what he said were the extreme and "wholly artificial" prices, $12 at interior points to $18 f.a.s., seaports, due to recent Japanese competition, domestic operators are barely able to continue. Even the slightest increase in freight rates added to this handicap, it was stated, can only serve to lessen the ability of domestic detinning plants to withstand Japanese competition.

More Code Budgets Submitted—Other Developments in NRA

WASHINGTON, Dec. 11.—The electric hoist and monorail manufacturing, the electroplating, metal polishing and metal finishing and the tubular split and outside pronged rivet manufacturing industries have made application to the NIRB for approval of their budgets and for termination of exemption from the administrative order which provides that code members are required to contribute only to the code covering their principal industry.

Criticisms, objections or suggestions with relation to the electric hoist and monorail application must be made to Deputy Administrator Beverly S. King, Room 307, Department of Commerce Building, prior to Dec. 22. Similar suggestions with regard to applications of the other two industries must be made to Deputy Administrator H. Ferris White, Room 510, 1518 K Street, N. W., those concerning the tubular split and outside rivet manufacturing industry to be filed by Dec. 21 and those concerning the electroplating industry by Dec. 24.

Sheet Metal Distributing

The sheet metal distributing trade, division of the wholesaling or distributing trade, has submitted for approval a proposed amendment to its divisional code which would remove the present limitation of "not more than three members" for each of its regional committees. Under the suggested change, each committee would include "three or more members." Objections to the proposed amendment may be made to Deputy Administrator Frank H. Crockard, City Club Building, 1320 G Street, N. W., before Dec. 24.

Rolling Steel Door

An amendment to the code for the rolling steel door industry, empowering the code authority to prepare and administer a budget and to collect mandatory contributions from members of the industry, has been approved conditionally by the NIRB. Suggestions or objections concerning it must be filed before Dec. 20 with Deputy Administrator Frank A. Hecht, 1518 K Street, N. W.

Special Tool, Die and Machine Shop Industry

The code authority for the special tool, die and machine shop industry has made application to the NIRB for approval of its budget for code administration and of its proposed basis of contribution from members of the industry. The budget submitted covers the calendar year 1935. Inasmuch as this exceeds the duration of the National Industrial Recovery Act, the matter of the time element will be subject to future adjustment.

The total amount of the budget proposed for the year is $65,350. Notice was given

(Continued on Page 63)

DUPONT TO INSTALL KOPPERS THYLOX LIQUID PURIFICATION PLANT

The E. I. Du Pont De Nemours Company has awarded The Koppers Construction Company a contract for a Thylox process liquid purification plant to be built at Belle, W. Va. This plant, which will be the largest of its type in the world, is designed to purify blue gas and to remove ninety-nine per cent plus of the hydrogen sulphide contained in this gas.

The plant will have a capacity to purify 45,000,000 cubic feet of gas per day.

Koppers liquid purification plants in designs specific to each case are in highly successful operation treating gases of the utmost divergence in hydrogen sulphide content, chemical and pressure characteristics. Skilled research has developed the appropriate equipment for manufactured gas, natural gas, refinery still gas and natural gasoline.

THE KOPPERS CONSTRUCTION COMPANY

KOPPERS BUILDING PITTSBURGH, PA.

... PERSONALS ...

C. E. DAVIES, since 1931 executive secretary of the American Society of Mechanical Engineers, was appointed national secretary of that society at a meeting of its council on Dec. 7. Mr. Davies has been a member of the staff of the society since 1920. He succeeds Dr. Calvin W. Rice, whose sudden death in October of this year terminated 27 years of active service. Mr. Davies was born in Utica, N. Y., and was graduated from Rensselaer Polytechnic Institute in 1914. He began his professional career in the production department of the Smith Premier works, Syracuse, N. Y., of the Remington Typewriter Co.

During the war, as first lieutenant and later as captain, he served in the Ordnance Department, U. S. Army, being assigned to the Frankford Arsenal. At the close of the war, Mr. Davies returned to the Remington company at its Ilion, N. Y., works, later resuming his connections with the Syracuse works, which he left in March, 1920, to take up the duties of associate editor of the American Society of Mechanical Engineers. In 1925 he was placed in charge of the administration of the headquarters office and in 1931 was appointed executive secretary. Mr. Davies serves the Newcomen Society (England) for the study of the history of engineers as honorary corresponding secretary for North America. He was the first secretary of the Engineers' Council for Professional Development, a conference of engineering, educational and licensing bodies that is concerned with the guidance, selection and education of engineering students, the accrediting of engineering school curricula, and of engineering after graduation from college, and their certification as members of professional engineering societies and as professional engineers.

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A. J. TOWNSEND, vice-president and general manager of the Rotary Electric Steel Co., Detroit, who has been chief executive officer of the company since its inception, has resigned as general manager because of ill health. He will continue as vice-president and a director, but during the time necessary to recuperate will confine his activities to those of an advisory and consulting capacity.

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C. PARKER HOLT has been named executive vice-president of the Caterpillar Tractor Co., Peoria, Ill. THOMAS J. CONNER has been made vice-president in charge of manufacturing and has been elected a director to fill the vacancy on the board caused by the death of Pliny E. Holt.

C. E. DAVIES

A. W. SCARRATT, since 1927 chief engineer in charge of motor truck engineering for the International Harvester Co., has been advanced to the post of chief engineer in charge of all automotive engineering activities. W. D. REESE, who recently joined the International organization as Mr. Scarratt's assistant, succeeds him as chief engineer of motor truck engineering.

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ALEXANDER BLACKWOOD, who has been engaged for the past 20 years in steel foundry and heat-treating activities, has been appointed general manager of the Dayton Steel Foundry Co., Dayton, Ohio. He received his technical training in Scotland and Germany and came to this country in 1907. Because of his training and experience in heat treatment of steels, he was appointed consulting metallurgist and manager of the Sauntry Process Co. Since 1908 he has been identified with several well known steel foundries, including the Michigan Steel Casting Co., Farrell-Cheek Foundry Co., and Chicago Steel Foundry Co.

A. BLACKWOOD

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ALLAN SEYMOUR, sales engineer of the grinding wheel division of the Norton Co., Worcester, Mass., has been made manager of the Philadelphia office. RALPH M. JOHNSON, who has been district manager, takes over Mr. Seymour's duties in Worcester.

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JOHN J. CAMPBELL has been promoted to the position of district sales manager in New York for the Eastern Rolling Mill Co., Baltimore.

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HURLBUT S. JACOBY, for many years vice-president and sales manager for H. K. Ferguson, Cleveland, engineer and contractor, has been appointed director of industrial research of Ohio State University. At present he is connected with the NRA in Washington. Mr. Jacoby was graduated from Cornell University, where he received degrees in Arts and Engineering in 1908 and 1910. He served as contracting engineer of the McClintic-Marshall Co., chief engineer for the Standard Steel Construction Co., and district manager for the Austin Co.

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A. BAIR BASSOFF, formerly production engineer of the Worth Steel Co. and more recently consulting engineer of the Sier-Bath Co., has been appointed executive engineer of the S-B. Gear Corpn., New York, which will shortly place on the market a complete line of speed reducers. Mr. Bassoff will have complete charge of development, design and production work and, in addition, will continue his connection as consulting engineer of the Sier-Bath Co.

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ARTHUR J. CAMPBELL has been made assistant general sales manager of the American Cyanamid & Chemical Corpn., New York, and at the same time will continue his duties as general manager of the structural gypsum division.

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CHARLES M. PACK, consulting engineer and metallurgist in the die-casting field, has rejoined the Doehler Die Casting Co., New York, as assistant to the president in charge of all research and development work.

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W. H. PETERSON, heretofore vice-president of M. D. Valentine & Brother Co., Woodbridge, N. J., has been elected president to succeed

FRANK R. VALENTINE, who has been made chairman of the board. M. D. MCCLAIN has been elected vice-president and GEORGE E. DIX, secretary.

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SIR ANDREW DUNCAN, chairman of the Central Electricity Board of England since 1926, has been appointed chairman of the British Iron and Steel Federation. In his new post he will play an important part in the future development of the industry's reorganization scheme, particularly in relation to the coordination of the diverse interests of the many different industries comprised within the membership of the federation.

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CLARENCE C. DODGE, president of George F. Blake & Co., Worcester, Mass., has been elected president of the New England chapter of the American Steel Warehouse Association. Other officers are: GEORGE R. BEASOM, of Scully Steel Products Co., first vice-president; CARROLL S. HARVEY, of A. C. Harvey Co., second vice-president, and CHAPIN E. HARRIS, of the Brown-Wales Co., secretary and treasurer.

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NORMAN F. TISDALE, formerly identified with the Republic Steel Corpn., at Buffalo, and more recently with the Titanium Alloy Mfg. Co., has become associated with the Molybdenum Corpn. of America, Pittsburgh.

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H. N. PICKETT, for a number of years advertising manager of the *Daily Metal Trade*, Cleveland, has been appointed to a corresponding position with the Toncan Culvert Manufacturers' Association, Youngstown. The association is engaged in the promotion of sales of Toncan iron corrugated pipe and sectional plate pipe manufactured by the Republic Steel Corpn.

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DR. V. N. KRIVOBOK, professor of metallurgy at Carnegie Institute of Technology, and associated with the research department of the Allegheny Steel Co., Brackenridge, Pa., will address the American Society for Metals on the subject of "Stainless Steels" at the Hotel Buffalo, Buffalo, Dec. 13.

The Bureau of Supplies and Accounts, Navy Department, will open bids Jan. 4 on 209 tons of forgings for shafting for the cruisers *Honolulu* and *Wichita*, to be built at the Brooklyn and Philadelphia navy yards, respectively.

▲▲▲ OBITUARY ▲▲▲

EARL C. MAXWELL, president of the Maxweld Corpn., manufacturer of welded tanks, Brooklyn, N. Y., died Dec. 7 in Nassau County Hospital of injuries suffered in an automobile accident. He attended the University of West Virginia and Columbia University, where he received an engineering degree. Mr. Maxwell was 54 years old.

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FREDOLF J. PETERSON, Detroit district representative of Electric Furnace Co., Salem, Ohio, died of pneumonia Dec. 2 after a brief illness, aged 49 years. He was born in Sweden, coming to this country when he was 17 years old and had been associated with the Electric Furnace Co. for 15 years during 12 of which he represented the company in Detroit. He was a member of the Detroit chapter of the American Society for Metals.

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J. FORREST HAHN, vice-president and treasurer of the National Enameling & Stamping Co., Milwaukee, died on Dec. 1 from a heart attack at his home in Fox Point, a suburb. He was born in Milwaukee in 1892 and spent most of his life there, with the exception of several years when he was in charge of the Malleable Castings Co., Beaver Dam, Wis. He became an executive of the National Enameling & Stamping Co. at its general offices in Milwaukee in 1927.

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FRANK M. EATON, formerly prominently identified with the iron and steel industry in Cincinnati and Birmingham, where he was connected with Hickman, Williams & Co., died at his home in Colorado Springs, Colo., Dec. 6, aged 67 years. He retired 18 years ago. He was a brother of Joseph O. Eaton, chairman of the board of Eaton Mfg. Co., Cleveland.

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JOHN D. HOLLOWELL, SR., at one time Chicago manager for the De Laval Separator Co. and later identified with the Dole Refrigerating Corpn., died Dec. 5 at Indianapolis, Ind., after a long illness. He was 67 years old and had retired from active business about two years ago.

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HORACE S. SARGENT, designing engineer, died at his home in Auburndale, Mass., Nov. 29, after an illness of two weeks. He was graduated from Massachusetts Institute of Technology in 1908, became a salesman for his father, who owned the Revere Drop Forge Co., and later was associated in an engineering way with an automobile company. He was associated with the Submarine Signal Co. at the time of his death. He was 52 years old.

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WILLIAM PAGE CHENEY, for many years resident manager for Rogers, Brown & Co., Pittsburgh, and later associated with the Boston office of Pilling & Co., Inc., died at the Somerville, Mass., Hospital on Dec. 3. Mr. Cheney was born in Somerville, Sept. 21, 1874. He retired from business several years ago.

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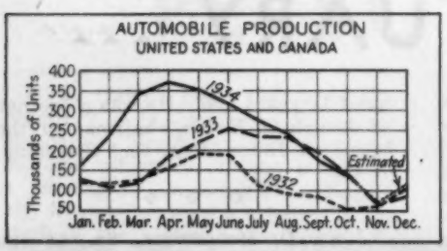
ALFRED E. ROBINSON, supervisor of power and gas plants at the Pittsfield, Mass., works of the General Electric Co., died on Dec. 6 at a Boston hospital after an operation. Mr. Robinson was born at Westfield, Mass., June 13, 1895.

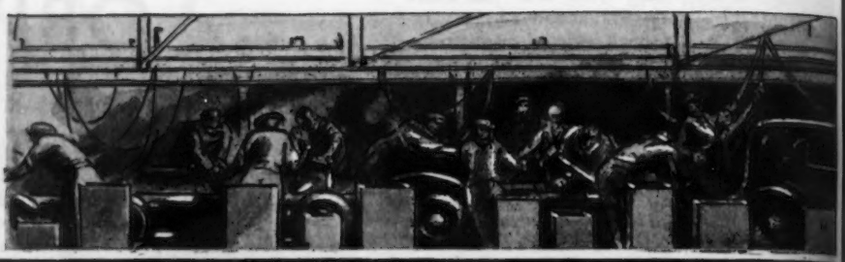
FHA Would Welcome Steel House Program

WASHINGTON, Dec. 11. — The Federal Housing Administration headquarters has stated that it has not been approached by any steel interests with regard to a project for building homes for employees, despite the currency of such reports. The FHA, however, would welcome any plan for the construction of such homes, which, it is reported, would be steel frame houses of moderate size, and readily give its aid toward financing such a program.

The FHA does not lend money, but under Title II of the act the Government can, under the new construction program, provide 100 per cent on mortgages up to 80 per cent on the value of dwellings costing not more than $20,000, the mortgage to run 20 years or less. Before providing such a guaranty, the FHA will appraise the property values and base its insurance upon the values determined, which may involve mortgages up to the point indicated or less.

The PWA has announced an allotment of $986,000 for repairs to the Boston army supply base. The fund will be used for repairing piers and wharves at the base.





THIS WEEK ON THE

Automobile Makers Speeding Assemblies For Early 1935 Shows

DETROIT, Dec. 11.

HAVING got off dead center and into low gear, the automobile industry is valiantly struggling to shift into second gear. It hopes to get its production machine into high gear before long, but there is slim chance of doing this during the present month. Although gains are being made in assemblies by many companies, output in December may not reach the 125,000 units earlier predicted.

Operations have not yet expanded to the point where projected factory schedules mean much. One day a definite goal is tentatively set up and the next day canceled in favor of a new one. The only statement which truthfully can be recorded is that numerous car manufacturers will attempt to make as many new models as possible in the next 30 days so that their dealers will be supplied with adequate stocks. Ford, all of the Chrysler divisions, Pontiac, Oldsmobile, Hudson-Terraplane and Studebaker, are included in this category.

Detroit already is feeling the impetus of increased automobile production in a sharp rise in the employment curve. On Dec. 1 the index of the local Board of Commerce stood at 62.4, compared with 51.9 on Nov. 15, 50.2 on Nov. 1 and 41.6 on Dec. 1 a year ago. A substantial improvement is anticipated for Dec. 15. Parts releases are being given in larger volume. Steel orders are considerably better and mostly for prompt delivery. Some of the tonnage is needed so badly that car manufacturers have specified rush shipment despite their known desire to keep year-end inventories at a bare minimum.

Speeding Up for Show

The evident wish of the industry to speed up activities is natural in view of the nearness of the New York show and the annual exhibits in other cities during January and February. The company with cars in dealers' hands ready for immediate delivery to customers will have an advantage, and each manufacturer will reach out for this advantage. So production will be spurred on by all the pressure which executives can exert. Detroit is of the opinion that the whip will begin to crack in earnest across the backs of suppliers just as soon as Ford comes into the open and announces prices. It is this event which will mark the beginning of the industry's 1935 campaign. Some of the steel people are convinced that there will be a grand rush then for early delivery of sizable tonnages and are not so sure that all will be able to get what they want when they want it.

Buick Plans Made Known

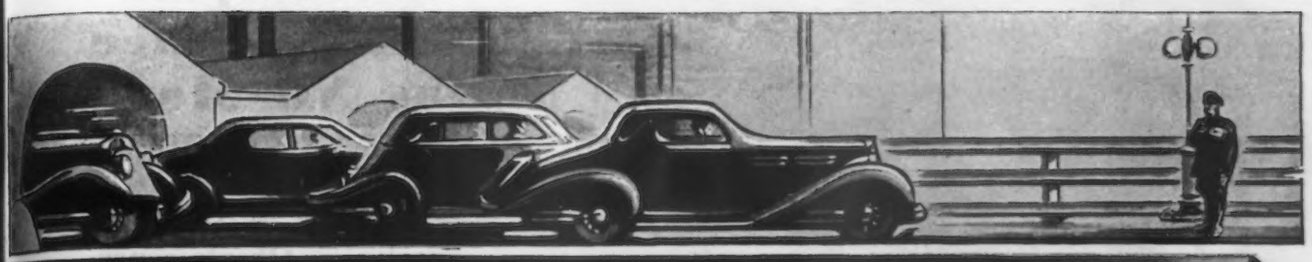
In the next two-and-a-half weeks the new model announcements promise to be numerous. Saturday Buick will introduce its 1935 line, which is the same as its present series with a few minor changes. Buick is known to be scheduled for a mid-year change in 1935 and therefore is retaining its current design during the first half of the coming year. For public consumption, since the public has been educated to expect something new at show time, it is going through the motions of a new car announcement. A convertible coupe is being added to the series 40. Buick's four lines of cars give price coverage of about 27 per cent of the entire automobile market. The series 40, introduced last May, is understood to have accounted for nearly half of Buick's sales the past year.

Pontiac is in production on its six and eight. The assembly line at Pontiac has been refitted to yield larger output. Pontiac's separation from Chevrolet extends to assemblies as well as manufacture of parts. That is, Pontiacs have been turned out the past year at several of the Chevrolet branch assembly plants, but this practice is said to have been abandoned. In the future all Pontiac cars will come off the line at Pontiac, Mich. The arrangement whereby Pontiacs were assembled in Chevrolet plants and parts made at Chevrolet's local factory is reported to have led to confusion and to have hampered Chevrolet. Pontiac had its dealers in to the factory in groups of about 250 the past week. The sheet metal department at Pontiac has been reconstructed and 15 new presses and three flash welding machines added.

Olds has been looked upon as the "trial horse" for General Motors. In 1933 it pioneered a body design and fender treatment which was followed in large measure by other divisions of the corporation, except Cadillac-La Salle, in 1934. For this reason its coming models hold uncommon interest for the trade. Both the six and the eight will be continued. Olds made the biggest percentage gain in sales in General Motors the past year. Incidentally, its relationship with its employees has been especially happy.

Chrysler Plans Being Shaped

De Soto, smarting under the stigma of having made the poorest record in Chrysler Corpn. during 1934, is out to regain its former position. Scarcely any company has ever been successful in graduating from one price class into a higher one, and De Soto's experience was no exception to the rule. Of course, the Airflow De Soto was so radically different from previous De Sotos that it was thought a price boost would be accepted by the public, but unfortunately it came at a time when the trend of buying was in the other direction. Under the circumstances, De Soto has elected to add a line of "aerodynamic" cars in its for-



ASSEMBLY LINE

By **BURNHAM FINNEY**
Detroit Editor, THE IRON AGE

mer price field. This line will be of conventional design. The Airflow will be continued with some modifications in front-end treatment.

Plymouth, supposedly, will not announce its cars until Jan. 5, but appears to be ready to make a public presentation before that time if sales strategy dictates such action. The point is that it is reported to be waiting for Ford to establish prices. As soon as Ford's prices are known, Plymouth appears likely to rush an announcement ahead of the official date. Plymouth is meeting the competition of knee action by the use of semi-elliptic, longitudinal, tapered-leaf front springs made out of "Mola" steel, a name coined by Plymouth officials to designate the molybdenum steel developed by C. Harold Wills and his associates in the Chrysler laboratories. This type of steel was first employed for coil springs the past year.

It is claimed by Plymouth that it has developed the first short leaf spring that is soft, resilient and long-lived. The spring uses two main leaves, each of which is wrapped around the shackle bolt. The lower leaf is segmented at the center to allow for elongation. The leaves are thinner at the ends than at the center. The front springs have the same frequency as rear springs. Further control of front-end bounce is achieved by double-acting shock absorbers and a ride stabilizer. Another factor contributing to a better ride is redistribution of weight, whereby the motor is moved forward and the back seat brought ahead of the rear axle.

These innovations on the Plymouth are also to be found on the Dodge. Both cars are well into their first production runs, with factories crowding parts suppliers for deliveries. The order is understood to have been passed out at Plymouth to get assemblies up close to plant capacity as soon as possible. Chrysler will have a conventionally styled six, as well as its Airflow eight. Production of both has started.

Ford is reported to have increased output of motors at Rouge to around 3000 units a day. The motors are being shipped to branch assembly plants, where they are being stored in anticipation of heavier requirements within the next month. Stories that Ford is unable to secure bodies are untrue, according to unofficial but authoritative sources. The fact is that bodies are being supplied at a relatively poor rate, but the volume is increasing daily. Delays in swinging into assemblies have postponed again the public showing of the new V-eight, which probably won't occur before Dec. 22, or about two weeks later than planned. Ford will make public announcement of its 1935 line of commercial cars and trucks on Saturday.

Although it is reported to be contemplating holding off the manufacture of its 1935 Master models until February, Chevrolet has been leading the industry in assemblies. In November it rolled up the astonishing total of 48,818 units, setting a new record for that month. The entire production is said to have consisted of Standard passenger cars and trucks. Retail sales also soared to 50,819 units, the highest figure ever attained in November, with the exception of that month in 1926. Chevrolet's branch assembly plants are understood to be scheduled to go from production of current models to that of new cars without a shutdown, an unusual procedure for any automobile company.

Packard has let it be known that it will announce its new light car shortly and that the new models will be displayed at the New York show. These models are believed to be handmade, as Packard is not prepared to start volume production of the new job until late January or February.

Hudson Getting into Production

Hudson-Terraplane is getting into production rapidly with a public showing of its new models scheduled for Saturday. Terraplane prices are down $15 to $35 compared with 1934. A new gear shift arrangement, designed by Hudson and Bendix engineers, is one of the most interesting features of the new cars. The shift operates from an H-plate mounted on the upper side of a bracket on the right side of the steering column. The actual shifting is accomplished by energy provided by the vacuum in the intake. If the automatic clutch (optional equipment) is employed, the shift takes place when the driver's foot is removed from the accelerator pedal. With the conventional foot pedal, the shift operates when the clutch is depressed. At such time the driver's right foot is normally withdrawn from the accelerator pedal, giving the right combination of movement and increase in vacuum required for gear shifting. The customer who bought a Hudson or Terraplane the past year had the choice of independent springing of the so-called "axleflex" type or the conventional front end. The same choice will be available in 1935, the axleflex unit being optional at extra cost.

Ford Expenditures Continue

Ford has continued to place orders with machine tool builders for equipment in connection with its expansion program at the Rouge plant. It will spend an additional $8,000,000 for further improvements beyond those already contracted for at a cost of $12,000,000. The entire program calls for the following expenditures: cold strip mill, $3,460,000; hot strip mill, $6,111,923; stripper building for handling ingots, $230,000; steam and electric units for power house, $4,599,888; blast furnaces and foundry equipment, $2,120,460; miscellaneous equipment, $3,144,250.

Aside from the Ford business, the equipment market has been quiescent. The machine tool trade is hopeful that buying will open up early next year, but at the moment no sizable inquiries are in sight. At least one division of Chrysler Corpn. is reported to have issued strict orders that no purchases of equipment are to be made until further notice.

General Motors sales to dealers in the United States and Canada, together with overseas shipments,

(Continued on Page 67)

The Grasp of Obsolescence Has NO Mercy

Unseen, Unheard — Slowly but nevertheless surely — Obsolescence takes his toll from Industrial plants—

BUT...

THE HAND *of*

Modernization shows the way to Overcome this devastating factor in Industrial Operating Costs.

Bullard offers TYPE "J", the small Mult-Au-Matic, for Achievement in Efficiency and Economy, and suggests your inquiry as to their possibilities for SAVINGS on your small high-speed work.

CAPACITIES

"J-7" 8-inches work diameter
"J-11" 12-inches work diameter

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Increase in Steel Output Is Sharpest Since July

Ingot Rate Rises Three and One-Half Points to 33 Per Cent of Capacity—Scrap in Eighth Consecutive Weekly Advance

THE upward trend in iron and steel demand is gathering momentum. Both steel production and scrap prices have risen for the eighth consecutive week, and the gain in output, from 29½ to 33 per cent of capacity, is the largest since the second week of July, following the Independence Day holiday. Scrap prices have advanced on a wide front, and increases on heavy melting grade of $1 a ton at Pittsburgh and 25c. a ton at Chicago have raised THE IRON AGE scrap index from $10.92 to $11.33 a ton, or $1.83 above the low for the year, reached in September and October.

The acceleration of steel works operations is due in part to the building up of stocks of ingots and semi-finished material preparatory to holiday suspensions, but it is attributable mainly to an unmistakable gain in consumers' needs.

The growth of bookings is all the more impressive because of continued delay in the launching of automobile production programs and the reluctance of steel buyers in general, in the absence of price incentives, to add to their stocks prior to inventory taking. Should a decline in steel output eventuate during the holiday weeks, as is now expected, the rebound in the new year will undoubtedly be sharp. And it will be proportionately sharper the longer motor car production is held in check. Earlier forecasts of a December output of 125,000 units are being revised downward, largely because of the industry's unwillingness to launch 1935 campaigns until new Ford prices are announced. But even in the face of this deferred activity, the accumulating needs of parts makers and other suppliers of the automotive trade are reaching sizable proportions and are directly responsible for nine-point gains in steel output at both Detroit and Cleveland.

TIN mill production, sustained in part by releases for holiday rolling, continues to hold at 45 per cent of capacity. Demand for standard pipe is receiving support from the Government-sponsored home modernization program, while specifications for oil country goods are holding at recent levels and drilling operations portend larger bookings early in the new year. Farm equipment makers continue to take steel at a good rate.

Structural steel awards, at 5800 tons as compared with 3850 tons a week ago, are very light. New projects total 8100 tons as against 11,890 tons in the previous week and 10,000 tons two weeks ago. Plate lettings total 1145 tons and new plate projects of 4600 tons include 4100 tons for the Colorado River aqueduct. The general contract for the Fort Peck, Mont., dam has been awarded, but the reinforcing steel requirements, amounting to 18,000 tons, may not be bought for several months.

The future of the public works program, which has been the main source of plate, shape and bar tonnage for many months, is in doubt, but in any case Congress will probably be asked for large appropriations to complete projects that have been started. Among types of new work which are now being favorably considered are grade separation projects.

RAILROAD demand shows more signs of life. The Santa Fe has issued inquiries for 27,000 tons of rails, and the Northern Pacific has made formal awards of 10,000 tons, tentatively placed several weeks ago. The Lehigh Valley may enter the market for 25,000 tons. A coal car shortage in the South has given new force to current proposals for new Government loans for equipment purchases. Several Western roads have placed their first orders for woven wire fencing in many months.

Pig iron buying has improved, with some buyers, particularly in the Central West, supplementing current orders to cover part of their first quarter needs. Virgin metal is becoming more attractive to buyers with every advance in scrap prices. A purchase of 5000 tons of basic was outstanding among recent orders.

Supplementary machine tool awards by the Army Ordnance Department bring total purchases to date up to $557,715.

STEEL output has risen two points to 21 per cent at Pittsburgh, one and one-half points to 35½ per cent at Chicago, one point to 25 per cent in the Philadelphia district, three points to 37 per cent in the Valleys, nine points to 50 per cent at Cleveland, 15 points to 70 per cent in the Wheeling district, nine points to 57 per cent at Detroit and 12 points to 33 per cent in the South. The Buffalo rate is off five points to 19 per cent.

THE IRON AGE composite prices for pig iron and finished steel are unchanged at $17.90 a ton and 2.124c. a lb. respectively. Bolts and nuts have been advanced through the dropping of one 10 per cent discount from list. Drawing extras of 25c. a 100 lb. have been eliminated on cold-finished sheets for automobile flat cowl panels, doors and two-piece backs.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Dec. 11, 1934	Dec. 4, 1934	Nov. 13, 1934	Dec. 12, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.26	$19.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	19.13	19.13	19.13	18.13
No. 2, Birmingham†	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	17.50
Basic, del'd eastern Pa.	19.76	19.76	19.76	18.76
Basic, Valley furnace	18.00	18.00	18.00	17.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.76
Malleable, Chicago*	18.50	18.50	18.50	17.50
Malleable, Valley	18.50	18.50	18.50	17.50
L. S. charcoal, Chicago	24.04	24.04	24.04	23.54
Ferromanganese, seab'd carlots	85.00	85.00	85.00	82.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	32.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	26.00
Slabs, Pittsburgh	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh	32.00	32.00	32.00	31.00
Wire rods, Pittsburgh	38.00	38.00	38.00	36.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.75
Bars, Chicago	1.85	1.85	1.85	1.80
Bars, Cleveland	1.85	1.85	1.85	1.80
Bars, New York	2.13	2.13	2.13	2.08
Plates, Pittsburgh	1.80	1.80	1.80	1.70
Plates, Chicago	1.85	1.85	1.85	1.75
Plates, New York	2.08	2.08	2.08	1.98
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.70
Structural shapes, Chicago	1.85	1.85	1.85	1.75
Structural shapes, New York	2.05¼	2.05¼	2.05¼	1.95¼
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.75
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.40

Finished Steel

	Dec. 11, 1934	Dec. 4, 1934	Nov. 13, 1934	Dec. 12, 1933
Per Lb.:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.25
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.35
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.75
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.85
Wire nails, Pittsburgh	2.60	2.60	2.60	2.35
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.40
Plain wire, Pittsburgh	2.30	2.30	2.30	2.20
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.25
Barbed wire, galv., P'gh	3.00	3.00	3.00	2.85
Barbed wire, galv., Chicago dist. mill	3.05	3.05	3.05	2.90
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	**$13.25**	$12.25	$10.75	$12.00
Heavy melting steel, Phila	10.75	10.75	9.63	10.00
Heavy melting steel, Ch'go	**10.00**	9.75	9.00	8.75
Carwheels, Chicago	**10.50**	10.00	10.00	9.50
Carwheels, Philadelphia	10.75	10.75	10.50	10.75
No. 1 cast, Pittsburgh	**12.75**	11.75	11.50	11.25
No. 1 cast, Philadelphia	11.00	11.00	10.75	11.25
No. 1 cast, Ch'go (net ton)	**9.50**	8.50	8.00	8.50
No. 1 RR. wrot., Phila	11.25	11.25	11.25	11.00
No. 1 RR. wrot., Ch'go (net)	8.75	8.75	8.00	7.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	**$3.85**	$3.85	$3.85	$3.75
Foundry coke, prompt	4.60	4.60	4.60	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡	8.75	8.75	8.75	7.75
Lake copper, New York‡	9.12½	9.12½	9.12½	8.00
Tin (Straits), New York	**51.05**	50.87½	51.35	52.65
Zinc, East St. Louis	3.70	3.70	3.75	4.50
Zinc, New York	4.05	4.05	4.10	4.85
Lead, St. Louis	3.35	3.35	3.45	4.05
Lead, New York	3.50	3.50	3.60	4.15
Antimony (Asiatic), N. Y.	13.75	13.75	10.50	7.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. ‡Blue Eagle copper.

▲ ▲ ▲

▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Dec. 11, 1934	2.124c. a Lb.	$17.90 a Gross Ton	$11.33 a Gross Ton
One week ago	2.124c.	17.90	10.92
One month ago	2.124c.	17.90	9.79
One year ago	2.008	16.90	10.25
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1934	2.199c., April 24	2.008c., Jan. 2	$17.90, May 1	$16.90, Jan. 27	$13.00, Mar. 13	$9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Production Up Two Points to 21 Per Cent at Pittsburgh

Valley Rate Rises Three Points to 37 Per Cent and Wheeling District Average Mounts 15 Points to 70 Per Cent—Scrap Up $1 a Ton

PITTSBURGH, Dec. 11.—Steel ingot output in the Pittsburgh district has risen two points this week to 21 per cent of capacity, the highest level reached since last June. Raw steel production in the Valleys and nearby northern Ohio mills is three points higher at 37 per cent. In the Wheeling district production has jumped 15 points to 70 per cent of capacity.

While the general increase in activity is attributable partly to heavier bookings for finished steel, an important factor influencing increased production is the desire of some mills to build up stocks of ingots and semi-finished grades in anticipation of the holiday shutdowns late in December. While producers are cheered by the contra-seasonal trend in finished steel orders and production, a further measure of encouragement is gleaned from the general character of the improvement.

The automotive trade has not released any exceptionally heavy orders to the Pittsburgh district for new model construction, and in the absence of such support the increased activity carries greater significance. Sustained engagement of tin plate mills at 45 per cent of capacity also is a prime factor in the current steel market. Sheet and strip mills are maintaining recent operating schedules, while wire mills are a shade busier as a result of improved industrial and jobbing demand. Heavy hot-rolled capacity in the Pittsburgh district continues to lag in the absence of railroad and constructional steel demand. The pipe market is featured by a steady movement of oil country goods.

Bolt and nut discounts have been lowered to 70, 10 and 10 per cent off list. No. 1 heavy melting steel scrap at Pittsburgh for the second consecutive week has advanced $1 a ton to $13 to $13.50, delivered.

Pig Iron

Foundry melt in the Pittsburgh district is beginning to reflect year-end trends. Spot shipments are sporadic, and the aggregate movement thus far in December has been rather meager. Consumer interest is fairly well sustained, but actual orders are not expected to follow until after the inventory period. Interest in pig iron has been stimulated further by the narrowing of the range in prices between scrap and pig iron. If scrap values advance much further, the natural expectation is that non-integrated steel mills will revert to the greater use of virgin metal. The Neville Island blast furnace has been banked, leaving no merchant stacks active in either the Pittsburgh or Valley districts.

Semi-Finished Steel

Wire rods are now quoted under two classifications, namely, common and combination rods, as noted in THE IRON AGE of Dec. 6, page 52. Common wire rods have been reaffirmed at $38 a gross ton, Pittsburgh, while combination wire rods have been established at $40, Pittsburgh. The latter classification refers to the type of mill on which combination rods are rolled. The $2 a ton differential between common and combination rods is based largely upon the greater suitability of the latter product for its purpose, which chiefly is for bolt and rivet manufacture. There has been no perceptible increase in the aggregate movement of semi-finished steel in the past week, but demand is fairly steady.

Rails and Track Accessory

Interest in this market is generally tentative in character. Few railroads are ready to make further important purchases of rails, with a majority deferring plans for next year until Federal financing machinery is set up. Carriers will soon enter the market for miscellaneous steel needs for first quarter, the first to appear being the Pennsylvania Railroad, which will open bids on Dec. 12 on a maximum of 5000 tons of various steel products.

Bolts, Nuts and Rivets

Important bolt and nut manufacturers have advanced prices by revising discounts on bolts and nuts to 70, 10 and 10 per cent off list. Stud bolts, track bolts, elevator bolts, tap and hanger bolts and corrugated carriage bolts will be advanced by a revision in discounts to 70 and 10 per cent off list. These changes apply to contract business as of Jan. 1 and to spot orders from Dec. 6. No change in the rivet setup has been made. The advances were based primarily upon the establishment of the $40 price for combination wire rods, which are favored for bolt and rivet manufacture, and also because chemical extras now applying to the combination wire rods have added considerably to manufacturing costs. Specifications on fourth quarter contracts have not thus far increased materially despite the advent of higher prices.

Bars

A slight improvement in general specifications is reported. Automotive shipments are expanding gradually. Miscellaneous business is maintaining an even keel. Agricultural implement makers are taking a fairly regular supply. The whole market, however, is now pointing to the post-inventory period, when specifications are expected to flow more freely.

Reinforcing Steel

Shipments for highway and building construction are at a seasonally low point. A generous amount of contracting for State road work is under way, but little tonnage for Northern road projects will be rolled before the spring. Small-lot orders for private needs are being booked quite frequently, but in the aggregate fail to add much to mill backlogs.

Cold Finished Steel Bars

This market continues to enjoy progressive improvement. Although automotive tonnage booked in the past week reflected an increase over the previous week's business, improvement on the whole is traceable to general specifications. Agricultural implement makers are appearing regularly in the market in preparation for seasonal engagement, while orders from textile machinery and business machine manufacturers are adding to general activity. Jobbers continue to lag.

Plates and Shapes

Small lots of plates for Navy destroyer construction have been placed with two producers in the Pittsburgh district. With the exception of some pending barge business, the plate market is devoid of important activity or prospects for notable improvement during the remainder of the month. By contrast the structural steel market offers little encouragement. Awards in the past week again dipped to disappointing levels, while inquiries were well scattered and for unimportant tonnages. State bridge construction almost invariably dominates new specifications each week. A large potential demand exists for structural steel for grade crossing elimination; but the problem of financing such work provides a formidable barrier to a move in that direction.

Tubular Products

Well sustained interest in oil country goods and standard pipe is en-

abling tube mills to maintain recent schedules. Drilling in some oil fields is increasing, with favorable prospects for greater activity next year. Standard pipe demand emanates chiefly from Federal-aided home rehabilitation. Mechanical tubing is slightly more active. Seamless commercial boiler tubes and locomotive tubing are relatively quiet.

Wire Products

Industrial requirements in wire are expanding, and releases from jobbers also are more frequent. The net result falls short of boosting wire mills' operations noticeably, but schedules for this time of the year, without any price incentive, are contraseasonal in trend. A slump in orders is expected to precede the year-end inventory period.

Sheets

Orders received in the past week reflected a noticeable improvement over the preceding week's bookings. Part of the improvement came from automotive specifications. Farm implement makers, the stove industry, metal drum manufacturers and electrical equipment producers are also important participants in the current market. Replenishment buying from jobbers is spreading. Operations for this week will likely hold to the recent average of 40 per cent of capacity, with strong prospects for a pickup toward the close of the week. Drawing extras of 25c. a 100 lb. have been eliminated on cold-finished stock for flat cowl side panels, doors and two-piece backs.

Tin Plate

Enough specifications against existing contracts and releases against 1935 orders were received in the past week to maintain an average output of 45 per cent of capacity. Some tapering in activity is considered inevitable after the Christmas holiday, since most consumers will endeavor to enter the new year with as small carryovers as possible.

Strip Steel

Hot rolling at some mills is at the highest point in several months. Fairly heavy releases from one or two motor car manufacturers are contributing to present activity, while general demand is holding its own. Agricultural implement makers are unimportant in this market.

Coke and Coal

Demand for heating coke has not responded to the recent severe cold weather. Dealers were heavily stocked prior to the cold spell, and the movement has not thus far been sufficient to require replenishment. Steam sizes of bituminous coal are virtually dormant. Foundry coke shipments are beginning to taper after a momentary pickup, while furnace coke is in extremely poor demand. All prices are firm and unchanged for delivery this month.

Scrap

Consumer covering for ordinary No. 1 heavy melting steel at $13.50 and reports of dealer purchases of that grade on the recent Pennsylvania Railroad list at $13.90, $14.10 and $14.25 have excited this market. For delivery to a Wheeling district mill dealers are reported to have paid nearly $13.50 for regular heavy melting steel. Another bullish influence is a rise in the Pittsburgh steel operations this week. Acknowledging the usual differential between railroad steel and yard scrap, ordinary No. 1 heavy melting steel is quotably higher this week at $13 to $13.50, with corresponding increases in other steelmaking grades. Heavy breakable cast and No. 1 cast are stronger on a 50c. rise. Railroad specialties on the latest New York Central list were sold at $15.75, Pittsburgh, while those on the Pennsylvania tender were sold to a dealer at approximately the same delivered basis. Low phosphorus grades are nominally higher, but consumer ideas of prices range about $1 a ton below dealer offering prices.

Pig Iron Buying Heavier at Boston

BOSTON, Dec. 11.—Upward of 1200 tons of pig iron has been sold for first quarter delivery, the largest weekly aggregate noted in months. Sales included Mystic, Buffalo, Alabama and Indian brands. Quite a few round tonnages are in the air, but there is nothing really definite regarding them, and in some instances credit is involved. The New England melt, however, has stepped up, largely because of the activity of Connecticut machine tool manufacturers. It is now approximately 30 per cent of rated capacity, as against 15 per cent two months back.

Higher prices for railroad steel in the Pittsburgh market are reflected in the local market for No. 1 heavy melting steel. The advance here, however, is not in proportion to that at Pittsburgh, the local price being not higher than $6.80 a ton, f.o.b. Bundled skeleton and forge flashing prices also have advanced slightly, but scrap prices otherwise remain as heretofore. For New England delivery there is, perhaps, somewhat more demand for textile and machinery cast. Only in the export scrap market, however, does real activity exist. Two boats will start loading here this week for ports not yet divulged. It is expected more boats will be loaded here this month, and next month another Providence, R. I., tonnage will be shipped. Exporters say they are prepared to meet the Pittsburgh scrap price and perhaps go it one better.

PWA Announces Third Chicago Housing Project

WASHINGTON, Dec. 11. — Announcement has been made by PWA of a third housing project for Chicago. It will cover about 70 acres and will cost approximately $12,500,000 on the basis of preliminary estimates. The project will be undertaken on the north side of Chicago and its development will be contingent upon acquisition of the site at a price which will allow construction "of true low-rent housing," according to Administrator Harold L. Ickes. The proposed project will provide dwellings for about 2500 families.

THE stainless steel front of the new S. S. Kresge Co. store at Canton, Ohio, was fabricated of Enduro metal, furnished by the Republic Steel Corpn., by The Sioux Metal Products Co., Sioux City, Iowa. The job included four marquees, window molding and sash, bands above display windows and other decorative work.

The Land of Enterprise

BETWEEN the first prospector panning for gold in the mountain stream and the modern processes of hydraulic mining lies a history which marks the Pacific Coast as the land of enterprise.

The imperative call of progress has been obeyed from San Diego Bay to the 49th parallel. Not alone gold, but also lumber, fishing, building, oil, transportation, agriculture, and a host of other industries have continuously held before themselves the goal of making tomorrow better than today.

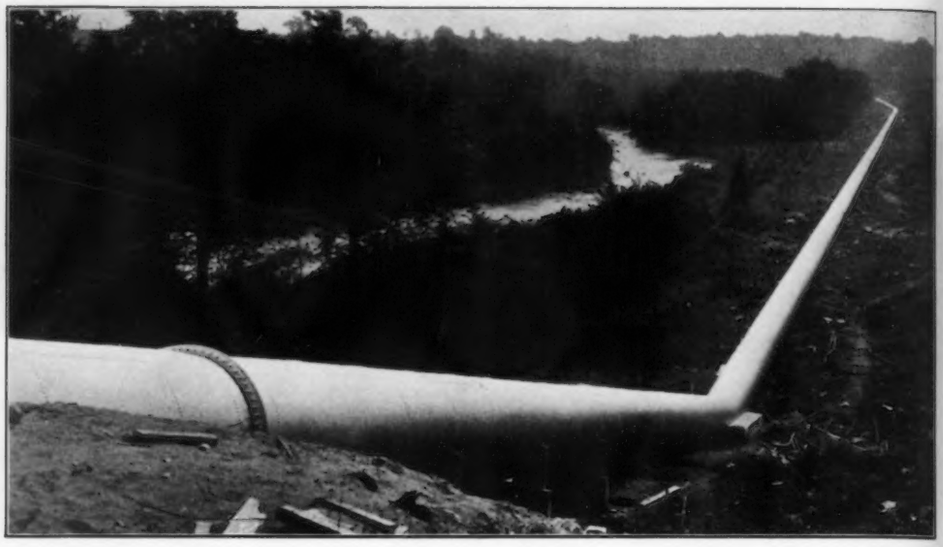
In this advancement Pacific Coast Steel Corporation feels its share of active responsibility. Drawing upon the scientific knowledge of the Bethlehem mills, selecting the processes and materials best adapted to this region, Pacific Coast Steel Corporation is in a position to supply the most effective grade of steel for every industrial development.

Whatever the requirement for steel, ready for tomorrow's specifications, we serve the Coast.

Pacific Coast Steel Corporation

Subsidiary of Bethlehem Steel Corporation

Steel Plates to serve the Coast



THE supplying of large quantities of steel plates for fabrication into riveted and welded pipe for power and water-supply projects is a typical example of Pacific Coast Steel Corporation's service to the Coast.

Plates for oil-refinery equipment; for marine and railway uses; for tanks, standpipes, and gas holders; plates to withstand extreme temperature ranges; to resist heat, corrosion, abrasion—these are but a few of the many grades of steel plates that we are supplying to customers on the Coast.

Drawing on the technical skill and vast experience of Bethlehem Steel Company, Pacific Coast Steel Corporation is in position to supply promptly steel plates that fully measure up to the intended task.

AMONG OTHER PRODUCTS:

TIN PLATE—Tin Plate that meets quality requirements with respect to both stamping quality and surface. The base is made from soft open-hearth steel, and the surface well coated with bright tin. This tin plate meets in every respect the exacting requirements of the salmon industry.

ALLOY STEELS—Every day sees the wider use of alloy steels for parts requiring exceptional strength and endurance. The facilities and broad metallurgical experience of Bethlehem Steel Company, insuring alloy steels of highest quality, are available to you through Pacific Coast Steel Corporation.

HOLLOW DRILL STEEL—Because of its "end-to-end" heat treatment and smooth bore, which prevents fatigue from getting a foothold, this hollow drill steel is virtually immune to fatigue. Made in Bethlehem Steel Company's Tool Steel Plant, where quality tool steels for every purpose are manufactured.

STRUCTURAL SHAPES—Steel for every structural requirement, from 36-inch I-beams for single-span bridges, down to the lightest angle bar. And a complete line of lighter sections, which architects and contractors are finding ideally suited for use in all types of light-occupancy structures.

REINFORCING BARS—A complete line of steel reinforcing bars for highway building and other construction. These bars have the required strength and elasticity, with uniform section, and evenly-spaced deformations. Bars are furnished plain, deformed and special, in squares and rounds.

STEEL PIPE—Care at every step of manufacture, the use of high-grade raw materials, repeated critical tests and inspections, insure steel pipe of uniformly high quality. Made in sizes from ¾ in. to 16 in., black and galvanized; standard, extra-strong, and double extra-strong.

Steel Bridges and Buildings, Bolts and Nuts, Sheets, Carbon Steel Bars, Wire, Wire Nails, Special Rolled Sections, Semi-Finished Steel, Pig Iron, Forgings, Castings, Wrought Steel Car Wheels and Axles, Rolled Steel Blanks, Trackwork for Steam and Industrial Railways, Mine Cars, Rails and Accessories, Boiler Tubes, Corrosion-Resisting Steels, Steel Sheet Piling.

Pacific Coast Steel Corporation

Subsidiary of BETHLEHEM STEEL CORPORATION

BETHLEHEM STEEL

STEEL MILLS AND WAREHOUSES—SAN FRANCISCO, LOS ANGELES SEATTLE

STRUCTURAL FABRICATING SHOPS—ALAMEDA LOS ANGELES

SALES OFFICES— SAN FRANCISCO: *20th and Illinois Sts.* LOS ANGELES: *Slauson Ave.*

SEATTLE: *W. Andover St.* PORTLAND: *American Bank Bldg.* HONOLULU, T. H.: *Schuman Bldg.*

Steel Output Gains One and One-Half Points at Chicago

Present Rate of 35½ Per Cent Is Supported by Heavier Bookings — Santa Fe Inquires for 25,000 Tons of Rails— Scrap Higher

CHICAGO, Dec. 11.—Ingot output has gained one and one-half points to 35½ per cent of capacity. The interesting point about the advance this week is the fact that the gain made at the end of last week has held, there having been no drop-back in Monday's operations. Both sales and specifications for finished steel have made further gains and the sources from which orders are coming are increasing in number. Automobile manufacturers, though steadily increasing the number of their orders, are nevertheless cautious, and many of them give the impression that they will feel their way through the remainder of this year.

The railroads are somewhat bolder in their actions. The Santa Fe is in the market for 27,000 tons of rails, and other rail programs are being given more consideration. Several Western lines have placed their first orders for woven wire fencing in many months.

There is a rather acute coal car shortage in the South and shippers in the North are having some difficulty in getting gondola cars. This situation is leading to active discussion of the car pool and in some quarters it is suggested that it may be necessary for the Government to finance 100,000 cars.

Dealers and brokers in scrap are more bullish, notwithstanding resistance offered by the larger consumers. Railroads, sensing a higher market, are withdrawing lists in the face of dealer offers that often are $1 higher than consumers will pay.

Pig Iron

Forward contracting has got away to a good start and in the first 10 days of December was over four times the volume added to books in the corresponding part of September. So far contracts are being placed on the basis of orders on foundry books, though as the month has advanced there have been more indications that foundrymen are growing less cautious. Most automobile foundries are stepping up production, and stove units have steady operations with orders sufficient to carry them through January. Another merchant stack is being lighted today at Toledo.

Cold-Rolled Steel

Output remains close to 35 per cent of capacity. This commodity remains listless, except for a moderate increase in orders from parts makers and automobile manufacturers. Forward contracting is light.

Wire Products

New business is the best in about four months, but only a small part of this consists of contracts for the coming quarter. However, first quarter inquiries are fairly numerous. Consumption at automobile plants is up and gains are noted in many directions throughout the manufacturing trade. At the same time caution is still the watchword and it will probably remain so during the closing days of this year. Several Western railroads have recently entered orders for woven wire fencing. The fencing needs of the railroads are thought to be very heavy. Production of wire products is being held at 30 per cent of capacity, and at that rate producers' stocks are not growing.

Rails

The Santa Fe has definitely come into the market for 27,000 tons of rails and orders may be closed at an early date. The Northern Pacific has entered formal orders for the 10,000 tons which was reported several weeks ago. It has awarded 6000 tons to Illinois Steel Co., 3500 tons to Bethlehem and 500 tons to the Colorado mill. Definite word from other Western railroads is lacking, though steel producers are confident that more rail business will reach them through the winter months and in the spring.

Plates

Current plate business is limited almost wholly to the small tonnages that are going to structural shops. However, an attractive tonnage will be used for the 1600 cars ordered by the Mexican railways. The successful bidders on these cars have not yet placed orders for steel. Another tonnage is in prospect for the Guttenberg, Iowa, dam.

Bars

Rather a sharp rise in bookings has been registered because of the growing needs of parts makers and automobile plants. Also worthy of note is a slight pick-up in demand from miscellaneous sources. Altogether, bar mills have had one of the best weeks in several months. Road machinery builders are maintaining a good operating rate and farm implement manufacturers are holding to the schedules reached at the turn of the month.

Structural Material

Dams along the Mississippi River are holding the center of interest in this market. R. C. Mahon, Detroit, has in the low structural figure on the Muscatine dam. Bids on the Guttenberg, Iowa, dam, No. 10, will be opened Jan. 9, plans being out this week. The State of Illinois will open bids Dec. 12 on 1000 tons for bridges.

Sheets

Manufacturers in general are taking more sheets and orders from automobile plants have increased. From the character of orders, sellers draw the conclusion that users' stocks have become ragged, especially as to gages, and further that consumers are now less willing to cut to size from their own stocks and are again ordering for specific needs.

Cast Iron Pipe

Fair tonnages are reaching foundries and a substantial amount of work is still pending. Fond du Lac, Wis., has rejected all bids and will readvertise next spring. Among awards recently made are: 200 tons by Cook County, Ill., 125 tons by Wayne, Mich., and 150 tons by Valparaiso, Ind. Private buying remains dormant.

Reinforcing Bars

Activity remains at a good level on small jobs, and shop operations are steady. The 18,000-ton Fort Peck, Mont., contract has been awarded, but the bars may not be bought for a year, there being much work to be done before concrete will be poured. The low bidder has been announced on the Muscatine, Iowa, dam, which will take 1275 tons of bars. The outstanding award is for 300 tons for a grain elevator at Cedar Rapids, Iowa.

Scrap

Heavy melting steel has moved up another 25c. a ton to a maximum of $10.25. A scramble is on to cover old orders and dealers are experiencing no difficulty in obtaining $10.75 from brokers. Attempts to draw scrap into Chicago from St. Louis are failing, and the belief is rapidly growing that an acute shortage of some grades is at hand. In the meantime, however, mills stand by and strongly resist brokers' ideas of prices, which are from 50c. to $1 a ton above current quotations. Railroads, sensing a higher market, are reluctant to sell, and some lists have been withdrawn. Relaying rails, 60 lb. and heavier, are quotable at Chicago in the range from $20 to $25 a gross ton, delivered.

Tin Plate Releases Boost New York District Bookings

Business From Other Sources, Mainly For Immediate Delivery, Indicates Slow Expansion of Steel Consumption

NEW YORK, Dec. 11.—Mills have received generous tin plate releases for holiday rolling, but entirely aside from this tonnage aggregate bookings of steel in this territory have shown a moderate increase. The tendency toward expansion at this season when most buyers are holding inventories to the minimum indicates that consumption is rising. This is also attested to by the fact that current orders are for immediate shipment with the time of delivery a paramount consideration.

Rodgers & Hagerty, Inc., New York, is low bidder on the Randall Island and Little Hell Gate piers for the Triborough bridge. Bayonne, N. J., has obtained a PWA loan for $1,281,000 for a new high school which is to be completed before next fall. Colgate & Co. plan to spend a half million dollars on the extension and modernization of their Jersey City, N. J., plant.

Rail buying in this district may not get under way for several weeks. The Lehigh Valley's requirements, however, may total as much as 25,000 tons. Most roads are in need of rails but are undecided as to whether to buy with Government loans or to order smaller quantities with their own funds. The red tape involved in Government financing is distasteful to most lines. Indicative of the pressing need of new rails is the fact that a maximum speed limit has been set on about 150 miles of main track on an important road. The Lehigh Valley's plans for rebuilding 1350 freight cars, steel for which is about to be placed, call for repairs of about 100 cars a month, insuring continuous shop operations throughout 1935.

Protests against the new quantity extras on plates and shapes are not confined to structural steel fabricators but are coming also from shipyards, car and locomotive plants and railroads. The small extra for special marking of structural shapes has also provoked criticism.

Warehouse business in November showed a seasonal decline from October, which was the best month in about two years.

Pig Iron

Sellers are a little disappointed by the fact that melters are still loath to go ahead with first quarter commitments. Most foundries are looking for better business to develop in January but, at present, their schedules, although slightly better than two months ago, are still spotty and unpredictable. Consequently they continue to limit their orders to carlots to fill in stock withdrawals. Last week about 2400 tons of fresh business came to sellers, as compared with 2800 tons in the preceding seven-day period and 1950 tons sold a fortnight ago. Probably the only development which would force in considerable forward tonnage would be the threat of passing on probable higher freight rates to consumers. Any action in this direction would undoubtedly be preceded by sufficient warning to enable full coverage by the trade.

Reinforcing Steel

Considerable tonnage is now active, but little new business was placed with local distributers last week. Kalman Steel Corpn. will supply 125 tons for a sewer in Yonkers, N. Y., and 100 tons for a school at Port Jefferson, N. Y. Pending business consists of about 1000 tons for the New York Federal building which may be let any day, and about 800 tons of bars and mesh covering various highway projects in New York and New Jersey, for which the general contracts have been awarded. Rodgers & Hagerty, Inc., was low on the general contract for the Triborough bridge piers. The disposition of some 600 tons of reinforcing required is somewhat in doubt. Billet steel bars are now 2.38c. a lb. and rail steel 2.23c. a lb., for carlots delivered in the New York district.

Scrap

Scrap brokers here are not inclined to consider new export business at present, as the domestic market is strengthening daily and scrap is hard to obtain to cover old contracts. The flow of steel from dealers to brokers is not particularly plentiful at the barge prices of $8.50 and $7 a ton for No. 1 and No. 2 respectively. However, sufficient material is coming out to load a number of boats in this territory. In spite of the increasing strength in the Pittsburgh market due to the high price paid for Pennsylvania Railroad steel, it is unlikely that brokers here will lift their barge prices in the near future. Quotations on foundry and rolling mill grades are unchanged from last week.

Public Projects Hold Interest at St Louis

ST. LOUIS, Dec. 11.—Shipments of pig iron are considerably ahead of this time last month, and the indications are that the December movement will continue to show an increase. This is because melters of foundry iron in most lines are busier than usual at this time of year and plan to have less cessation of operations during the Christmas holidays than for some time. This is especially true of the stove interests in the district and vicinity, whose business has been greatly stimulated by the cold weather, and of the implement manufacturers in Peoria and in the Moline district. These melters are specifying conservatively, however, as they do not want to stock up too heavily on raw materials just before inventory time. While there is no rush to cover first quarter requirements, now that the price has been established, quite a few contracts have been closed for tonnages up to 500 tons.

Public works continue to lead in interest in structural projects. The State of Missouri will open bids on Dec. 20 for eight highway bridges, requiring 1000 tons of structural steel and 450 tons of reinforcing bars. Factors here are interested in a call for bids Jan. 9 for a Government dam at Guttenberg, Iowa, requiring 1850 tons of structural steel and 950 tons of reinforcing bars. Springfield, Ill., will ask for new bids on a filtration plant requiring 400 tons of structural steel. The Laclede Steel Co. has been awarded 432 tons and the Missouri Rolling Mills Corpn. 143 tons, of 575 tons of reinforcing bars for the Hampton Avenue viaduct here. Buying of finished steel is limited.

An East Side mill bought approximately 3000 tons of heavy melting steel at 25c. a ton above the prices prevailing in the preceding week. Inquiries of other mills are increasing, and it is expected that a buying movement will manifest itself after the turn of the year. Steel rails less than 3 ft. in length are up $1 a ton, railroad springs, steel car axles, steel angle bars and railroad malleable are 50c. a ton higher, and No. 1 heavy melting steel has advanced 25c. a ton. Railroad lists closing this week include the Missouri Pacific, 60 car loads, and the Missouri-Kansas-Texas, 1000 tons.

Cleveland-Lorain Rate Rises Nine Points to 50 Per Cent

Blast Furnace Is Lighted at Lorain—Both Automotive and Miscellaneous Demand Increase — Bolt Prices Advanced

CLEVELAND, Dec. 11.— Ingot output in the Cleveland-Lorain territory jumped nine points to 50 per cent of capacity this week, two open-hearth furnaces being put on in Cleveland and two in Lorain. This is the highest operation since last June. The National Tube Co. today lit another blast furnace in Lorain, increasing its operation to two out of five stacks.

Orders for sheets and strip steel continue to come from the automotive industry in fair volume and these in the aggregate make up considerable tonnage, although there is no large-lot buying by the automobile manufacturers. Chrysler parts makers in this territory are being crowded for deliveries. The Fisher Body Co. has resumed the operation of its Cleveland plant for the manufacture of Chevrolet bodies and has issued releases for shipment of sheets and strip steel placed a few weeks ago. It probably will take this plant a few weeks to get under good production.

Miscellaneous demand for finished steel is slowly expanding and the tonnage entered in December promises to show a considerable increase over the November volume. Most of the current orders are for steel for work under contract rather than for the building up of stocks. Some consumers are placing definite orders for steel for delivery during each month of the first quarter rather than covering with quarterly contracts. Commitments of this character are for carbon and alloy bars and billets, sheets and hot-rolled strip. Railroad orders are light and prospects for early improvement in the construction field are not bright.

Pig iron is more active than for many months. While there is no first quarter contracting, many foundries are supplementing purchases for early requirements with enough additional iron to carry them over a few weeks in the new year.

Bolt and nut prices have been restored to the discounts that prevailed before the reduction made two months ago. These prices are quoted for the first quarter, and rivet prices have been reaffirmed for the delivery. Scrap prices have again advanced sharply.

Pig Iron

The volume of business shows a sizable increase. Many consumers, now that first quarter prices are established, are placing contracts to cover part of their first quarter requirements, in addition to their current needs. Orders have increased in size because of this forward buying. One producer made two sales of 1000 tons each during the week and several in 200 to 500-ton lots. The greater part of the demand was from automotive foundries. Agricultural implement foundries are buying more iron than they have recently. Producers expect that the advance in cast scrap will lead foundries to use more pig iron and less scrap in their mixtures.

Bars, Plates, and Shapes

New business in bars is fairly good. While this is largely from makers of automobile parts, miscellaneous demand is expanding. Forge shops having contracts for automotive work are securing releases rather slowly. There is virtually no new inquiry for fabricated work and awards of 3000 tons of steel for the Lorain Bridge, as well as several other projects, are still pending. Plates continue dull.

Sheets

Demand from the automobile parts makers gained during the week owing to releases from stamping plants in this territory of orders for Chrysler parts. A fair volume of business also reached Ohio mills directly from the Michigan automobile plants, considerable of the tonnage in cold-rolled material being placed for early January shipment. The Fisher Body Co. has started up its Cleveland plant and has released some steel for delivery to that plant. Demand from washing machine manufacturers, which slumped last month, shows some revival.

Strip Steel

Some additional new business in both hot and cold-rolled strip came from manufacturers of automobile parts and accessories for prompt shipment. Hot-rolled strip is being ordered freely by cold-rolling plants for manufacturing lamp and fender stock. Demand from miscellaneous sources is light.

Bolts, Nuts and Rivets

Leading bolt and nut makers advanced prices Dec. 6 by dropping one 10 per cent discount from the list, thus restoring quotations to 70, 10 and 10 per cent off list, where they were before the reduction two months ago. The new prices apply both to spot business and the first quarter. As consumers and jobbers generally are covered by contracts, little business will be taken at the advance before January. The advance is expected to drive out a good volume of specifications from jobbers during the remainder of December. Demand from the motor car industry shows an upward tendency.

Rivet manufacturers have reaffirmed the present price of $2.90, Cleveland, per 100 lb. and $3, Chicago, for large rivets for the first quarter and 70 and 5 per cent off list for small rivets. Cap and set screw manufacturers have advanced prices about 10 per cent.

Scrap

Prices have again moved upward, advancing $1 a ton on heavy melting steel and other steel-making grades and 50c a ton on blast furnace scrap. The local market is reflecting the strong tone in the Pittsburgh and Wheeling districts. Sales of No. 1 heavy melting steel are reported at $14 for delivery in Steubenville, and dealers are paying $13.50 for shipment to that point. A Cleveland consumer purchased several hundred tons of blast furnace scrap a few days ago at $7, but today probably would have to pay at least 50c. a ton more.

Raw Steel Output Sustained on Coast

SAN FRANCISCO, Dec. 10.—Although several projects calling for major tonnages are pending, few new calls for bids were issued during the week. The readvertising of the contract for approximately two miles of syphons on the Colorado River aqueduct was the outstanding development. The 4100 tons of plates and 170 tons of structural steel required for this unit will be purchased by the Metropolitan Water District of Southern California within the next 60 days.

Massman Construction Co., Kansas City, Mo., has been formally awarded the contract for the construction of the Fort Peck, Mont., spillway dam. The contractor will purchase 18,000 tons of reinforcing bars and 722 tons of steel sealing strips for the project.

A fire at the Pacific Coast Steel Corpn. plant at Alameda, Cal., resulted in $50,000 damage to a loading wharf and materials. It is

reported that the several thousand tons of structural steel for the Golden Gate bridge which are in storage were not affected and that the bridge work will not be delayed.

Few bookings of heavier tonnages have been reported during the week. Pacific Coast Steel Corpn. took 600 tons of reinforcing bars for the George Washington school at San Francisco. Approximately 645 tons are yet to be placed. Poole & McGonigle will furnish 250 tons of structural steel for the State College science building at Pullman, Wash.

No decrease in operation of furnaces has been reported at any Coast plant, although the finishing mills have shown a tendency to curtail production. Warehouse business will probably show a favorable gain for the year over the previous year. Cast iron pipe demand is more active than at the beginning of the quarter, although most contracts are for small tonnages.

Reinforcing Steel

Awards 2400 Tons—New Projects 2875 Tons

Yonkers, N. Y., 125 tons, sewer, to Kalman Steel Corpn.

Port Jefferson, N. Y., 100 tons, school, to Kalman Steel Corpn.

Lawrenceburg, Ind., 600 tons, building for Joseph E. Seagreen, to Pollak Steel Co.

Danville, Ill., 180 tons, Veterans' Bureau, to Joseph Ryerson & Son; previously reported to an unnamed bidder.

Cedar Rapids, Iowa, 300 tons, grain elevator, to Inland Steel Co.

St. Louis, 575 tons, Hampton Avenue viaduct, 432 tons to Laclede Steel Co. and 143 tons to Missouri Rolling Mills Corpn.

San Francisco, 600 tons, George Washington school, to Pacific Coast Steel Corpn., 645 tons yet to be placed.

Washington County, Idaho, 103 tons, State bridge, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Gallipolis, Ohio, 800 tons, Ohio River dam; Dravo Contracting Co., Neville Island, Pa., low bidder for general contract.

Fort Peck, Mont., 18,000 tons, dam, Massman Construction Co., Kansas City, Mo., contractor.

Chicago, 250 tons, Armour slaughter house.

Hammond, Ind., 1000 tons, filter plant; bids taken but extension asked on bids.

Muscatine, Iowa, 1275 tons, dam across Mississippi River; Central Engineering Co., Davenport, Iowa, low bidder on general contract.

State of Missouri, 450 tons, highway projects; bids open Dec. 20.

Guttenberg, Iowa, 950 tons, dam No. 10 in Mississippi River; bids to be opened Jan. 9 by United States Engineer's Office at Rock Island, Ill.

San Francisco, 2300 tons, viaduct and approaches on Trans-Bay bridge; revised specifications call for bids on entire construction and not in two parts.

San Francisco, 425 tons, enlargement of O'Shaughnessy dam; bids Jan. 8.

Philadelphia District Mills Operate Fractionally Higher

Scrap Maintains Strength Despite Absence of Mill Buying—Bolts and Nuts Higher—Autobody Builders Look for More Activity

PHILADELPHIA, Dec. 11. — The failure of better demand to put in an appearance has so far not dampened the expectations of the trade regarding more encouraging operations early in the new year. Seemingly steel sellers are basing their hopes not on the revival of some one consuming line but on the fact that users are now preparing for inventory with far less steel on hand than in any similar period in the past few years. Previously stocks had been swelled out of proportion to requirements as a protection against price advances, but the present steadiness of quotations has obviated the necessity again to act in such a manner. About the only incentive now present to influence heavy forward coverage is the pending application of quantity extras on plates and shapes, which has not yet had any significant influence on the market.

Most of the mills in this territory are scheduling weekly rolling operations with little or no backlog, although enough miscellaneous orders are trickling in to prevent the stocking of semi-finished steel. However, there is no indication that open-hearth activity will expand much in the near future. The largest interest in this district has temporarily added another melting unit, and the aggregate operating rate of the area is one point higher at 25 per cent of capacity.

Bolt and nut sellers have advanced prices on first quarter business and are now quoting 70 and two tens off list. However, users with contracts have ample time to stock up as shipments at 70 and three tens will prevail until Jan. 15. In fact, quite a bit of such business has already come in for shipment after the inventory period. Although spot orders not covered by contract should now go at the new prices, a few small plants are still taking business at 70 and four tens. Small and large rivets are unchanged at 70 and five off list and $2.90 per 100 lb., Pittsburgh base, respectively.

Pig Iron

Consumers in the Middle West have entered orders for a few first-quarter tonnages, but no sizable business has come to light in this area. The hesitancy of melters is warranted by the doubtful outlook, for foundries here must depend on miscellaneous demand in the absence of railroad and shipbuilding orders and the only moderate requirements of machinery builders. Pig iron sellers are currently filling routine carlot orders, and there is not much expectation of heavier inquiry prior to mid-January. At that time inventories will have been taken, and melters may be inclined to rebuild their yard stocks to more normal levels.

Sheets

Radio makers are purchasing small lots of cold-rolled strip, but sheets are far from active with only auto stamping plants and routine miscellaneous demand to support the market. The local auto body plants are purchasing weekly lots of sheets on a moderate scale, but look for considerable expansion of their requirements early next year. Neither the railroads nor shipbuilders have indicated that their requirements early in 1935 will exceed the routine tonnages which have currently been coming in.

Bars, Plates, and Shapes

Sellers here are figuring on 4500 tons of steel bars for a Norfolk & Western building at Roanoke, Va., on which bids are due Dec. 19. Otherwise bars are not even moderately active. Sellers of structural shapes here have not as yet benefited by the recent Navy awards. Consequently the trade is concentrating on the few highway projects which are coming up in Pennsylvania and nearby States. The John J. Pettijohn Co., Lynchburg, Va., secured the general contract on a tractor building for the Blue Ridge Co. at Glasgow, Va. The 400 tons of shapes for this job is expected to be placed soon. New projects include 550 tons for a bridge at Pompton Plains, N. J., on which bids are due Dec. 27. Sellers are also entering tenders before Dec. 14 covering about 300 tons of shapes and 75 tons of bars for three highway bridges in Pennsylvania. The plate market is almost lifeless, and sellers are hoping that the Reading Railroad will soon make a disposition of about 800 tons for car repairs. The Hammond Iron Works was awarded a contract for

tanks requiring 400 tons of plates to be erected at Edgemoor, Del., for E. I. du Pont de Nemours & Co., Inc.

Imports

The following iron and steel imports were received here last week: 3500 tons of chrome ore from Turkey; 460 tons of pig iron from British India; 34 tons of steel bands from France; 31 tons of structural shapes and 4 tons of steel bands from Belgium; 29 tons of steel tubes, 14 tons of steel bars, 13 tons of steel forgings and 9 tons of bar iron from Sweden, and 15 tons of steel bands from Germany.

Scrap

With the Pennsylvania Railroad scrap having gone for more that $14 in the Pittsburgh district and brokers along the North Atlantic seaboard having been caught a little short for export accounts, some rather unusual prices are being bandied about in the trade. Much of the strength in the market here is derived from broker-dealer activity, with consuming mills continuing to be interested observers. The scrap trade believes that present quotations will not react to any extent before the second quarter, but this attitude is based largely on the hope that significant domestic purchasing will appear before that time. Brokers here are actively buying for export accounts. As no new domestic business has been covered, prices on steel remain unchanged from last week. There is a noticeable scarcity of steel axles and car wheels, and quotations on these items have advanced to $17 and $12 respectively. A boat has just left Port Richmond for Japan; another boat arrives Dec. 13 to load stove plate and steel for the Continent, and on Dec. 15 a boat partially loaded in Baltimore will arrive here to complete her cargo of steel for Japan.

A. F. of L. Automotive Union Members Will Refuse to Vote in Plant Elections

DETROIT, Dec. 11.—The American Federation of Labor has announced that members of the United Automobile Workers Federal Labor Unions will refuse to participate in the elections to be held in automobile plants under the supervision of the Automobile Labor Board. Francis J. Dillon, general organizer of the Federation at Detroit, said that the automobile unions have the full support of President William Green in their stand. This action has grown out of the statement made on Dec. 7 by the Automobile Labor Board that an election of representatives will be held shortly in the plant of the Cadillac Motor Car Co., division of General Motors Corpn.

Carrying out the proportional representation plan named in the President's Agreement of March 25, settling the threatened automobile strike, the board has outlined the procedure to be followed in the Cadillac election and all subsequent automobile plant elections. Its statement reads, "The nominating and final elections will be held in the plant under the sole supervision of agents of the board to insure freedom and secrecy. The employees, according to the ballots being prepared by the board, will nominate and vote for their representatives and will, if they so desire, specify the group with which their candidate is affiliated. The total of such specifications throughout the plant for each group will determine the proportion which each of such groups will have on the bargaining agency. Those who do not specify a group will be treated as a group. Representatives will not be restricted to employees. Arrangements will include opportunity for employees not working at the time to participate.

Various Employee Groups Represented

From the board's statement, it is seen that the collective bargaining committee to meet with the management will consist of representatives of various employee groups in proportion to the strength among the workers, thus giving recognition to employees' associations outside the circles of organized labor. More important, it provides for representation of workers who are not affiliated with any organization. In the conduct of elections each plant will be divided into districts according to the departments in which the men work.

Each worker will write on a ballot the name of the man he wishes to represent him and may add if he desires the name of the organization with which he is affiliated. The two men receiving the highest number of votes in each district will be considered nominated and their names printed on the final election ballot. Men who are on the company payroll but not employed at the time of the election will have an opportunity to vote and will be notified when and where to cast their ballots. If the representatives receiving the largest number of votes for all districts do not provide proportional representation for all substantial labor groups in the plant, sufficient additional representatives will be added from among candidates receiving the next highest votes in the plant in any groups entitled to more representatives on the bargaining agency.

The proportional representation plan laid down by the board is directly contrary to the policy of majority rule established by the National Labor Relations Board in recent plant elections. The American Federation of Labor, in taking a stand against participation in the contemplated elections, contends that the President's Agreement of March 25 has been outmoded by events since that date which have set up the principle of majority rule in collective bargaining.

It says, moreover, that its understanding of the agreement was that by proportional representation was meant the right of each separate organization such as the federation to have its own bargaining committee meet with the management. It is of the opinion that a single committee consisting of members of varying opinions and interests will be ineffectual and get nowhere. The federation objects strenuously to the fact that under the proposed rules of the Automobile Labor Board the individual worker will be voting for a person rather than an agency such as the federation, and asserts that this procedure does not constitute collective bargaining in the true sense of the term.

Aside from its opposition to the plan itself, the federation has raised the question of why the Cadillac plant was selected as the first place to hold an election, since no request had been made for an election there. On the other hand, the federation says that last April it made formal requests, never acted upon, for elections in some 15 plants in the automobile industry. It claims that the board has never certified a single list of members submitted to it in connection with the specified method for establishing the right to bargain collectively with the management in various plants.

To Build Large Zinc Rolling Mills

THE Lewis Foundry & Machine Co., Coraopolis, Pa., subsidiary of Blaw-Knox Co., has received an order for complete semi-continuous zinc strip rolling mill installation from the Ever Ready Co., London, England. The company is building a duplicate of this installation for Ball Brothers Co., Muncie, Ind., and the two mills when completed are expected to be the largest zinc rolling mills in the world.

The order from England comprises roughing and finishing mills, tables, coilers, blockers, transfer tables and manipulating equipment. In this installation the handling of metal will be entirely automatic from the melting ladle to the warehouse. Shipment of the order will be made in approximately 12 weeks.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel	*Base per Lb.*
F.o.b.	Pittsburgh	1.80c.
F.o.b.	Chicago	1.85c.
F.o.b.	Gary	1.85c.
F.o.b.	Duluth	1.95c.
Del'd	Detroit	1.95c.
F.o.b.	Cleveland	1.85c.
F.o.b.	Buffalo	1.90c.
Del'd	Philadelphia	2.09c.
Del'd	New York	2.13c.
F.o.b.	Birmingham	1.95c.
F.o.b.	cars dock Gulf ports	2.20c.
F.o.b.	cars dock Pacific ports	2.35c.

Rail Steel

(For merchant trade)

F.o.b.	Pittsburgh	1.70c.
F.o.b.	Chicago	1.75c.
F.o.b.	Gary	1.75c.
F.o.b.	Moline, Ill.	1.75c.
F.o.b.	Cleveland	1.75c.
F.o.b.	Buffalo	1.80c.
F.o.b.	Birmingham	1.85c.
F.o.b.	cars dock Gulf ports	2.10c.
F.o.b.	cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b.	Pittsburgh	2.05c.
F.o.b.	Chicago	2.10c.
F.o.b.	Gary	2.10c.
Del'd	Detroit	2.20c.
F.o.b.	Cleveland	2.10c.
F.o.b.	Youngstown	2.10c.
F.o.b.	Buffalo	2.10c.
F.o.b.	Birmingham	2.10c.
F.o.b.	cars dock Gulf ports	2.45c.
F.o.b.	cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b.	Pittsburgh	1.90c.
F.o.b.	Chicago	1.95c.
F.o.b.	Gary	1.95c.
F.o.b.	Cleveland	1.95c.
F.o.b.	Youngstown	1.95c.
F.o.b.	Buffalo	1.95c.
F.o.b.	Birmingham	1.95c.
F.o.b.	cars dock Gulf ports	2.30c.
F.o.b.	cars dock Pacific ports	2.30c.

Iron

F.o.b.	Chicago	1.80c.
F.o.b.	Terre Haute, Ind.	1.75c.
F.o.b.	Louisville, Ky.	2.10c.
F.o.b.	Danville, Pa.	1.80c.
F.o.b.	Berwick, Pa.	1.70c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b.	Pittsburgh	2.10c.
F.o.b.	Chicago	2.15c.
F.o.b.	Gary	2.15c.
F.o.b.	Cleveland	2.15c.
F.o.b.	Buffalo	2.20c.
Del'd	Detroit	2.30c.
Del'd	eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

Base per Net Ton

F.o.b.	Pittsburgh	$50.00
F.o.b.	Chicago	50.00
F.o.b.	Duluth	51.00
F.o.b.	Cleveland	50.00
F.o.b.	Birmingham	53.00
F.o.b.	Houston, Orange, Beaumont, Galveston	59.00
F.o.b.	Mobile	58.00
F.o.b.	New Orleans, Lake Charles, Corpus Christi	59.00
F.o.b.	cars dock Pacific ports	63.00

Plates

Base per Lb.

F.o.b.	Pittsburgh	1.80c.
F.o.b.	Chicago	1.85c.
F.o.b.	Gary	1.85c.
Del'd	Cleveland	1.985c.
F.o.b.	Coatesville	1.90c.
F.o.b.	Sparrows Point	1.90c.
Del'd	Philadelphia	1.985c.
Del'd	New York	2.08c.
F.o.b.	Birmingham	1.95c.
F.o.b.	cars dock Gulf ports	2.20c.
F.o.b.	cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh		3.00c.

Floor Plates

F.o.b.	Pittsburgh	3.35c.
F.o.b.	Chicago	3.40c.
F.o.b.	Coatesville	3.45c.
F.o.b.	cars dock Gulf ports	3.75c.
F.o.b.	cars dock Pacific ports	3.90c.

Structural Shapes

Base per Lb.

F.o.b.	Pittsburgh	1.80c.
F.o.b.	Chicago	1.85c.
Del'd	Cleveland	1.985c.
F.o.b.	Buffalo	1.90c.
F.o.b.	Bethlehem	1.90c.
Del'd	Philadelphia	2.005c.
Del'd	New York	2.0525c
F.o.b.	Birmingham (standard)	1.95c.
F.o.b.	cars dock Gulf ports	2.20c.
F.o.b.	cars dock Pacific ports	2.35c

Steel Sheet Piling

Base per Lb.

F.o.b.	Pittsburgh	2.15c.
F.o.b.	Chicago	2.25c.
F.o.b.	Buffalo	2.25c.
F.o.b.	cars dock Gulf ports	2.60c.
F.o.b.	cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10,	f.o.b. Pittsburgh	1.85c.
No. 10,	f.o.b. Gary	1.95c.
No. 10,	del'd Detroit	2.05c.
No. 10,	del'd Phila.	2.14c.
No. 10,	f.o.b. Birmingham	2.00c.
No. 10,	f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24,	f.o.b. Pittsburgh	2.40c.
No. 24,	f.o.b. Gary	2.50c.
No. 24,	del'd Detroit	2.60c.
No. 24,	del'd Phila.	2.69c.
No. 24,	f.o.b. Birmingham	2.55c.
No. 24,	f.o.b. dock cars Pacific ports	3.05c.
No. 24,	wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10	gage, f.o.b. Pittsburgh	2.50c.
No. 10	gage, f.o.b. Gary	2.60c.
No. 10	gage, del'd Detroit	2.70c.
No. 10	gage, del'd Phila.	2.79c.
No. 10	gage, f.o.b. Birmingham	2.65c.
No. 10	gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20	gage, f.o.b. Pittsburgh	2.95c.
No. 20	gage, f.o.b. Gary	3.05c.
No. 20	gage, del'd Detroit	3.15c.
No. 20	gage, del'd Phila.	3.24c.
No. 20	gage, f.o.b. Birmingham	3.10c.
No. 20	gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24,	f.o.b. Pittsburgh	3.10c.
No. 24,	f.o.b. Gary	3.20c.
No. 24,	del'd Phila.	3.39c.
No. 24,	f.o.b. Birmingham	3.25c.
No. 24,	f.o.b. dock cars Pacific ports	3.70c.
No. 24,	wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24,	unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b.	cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20,	f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28,	f.o.b. Pittsburgh	2.75c.
No. 28,	Gary	2.85c.
No. 28,	cars dock, Pacific Coast ports	3.35c.

Tin Plate *Per Base Box*

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb.	coating I.C.	$10.00
15-lb.	coating I.C.	12.00
20-lb.	coating I.C.	13.00
25-lb.	coating I.C.	14.00
30-lb.	coating I.C.	15.25
40-lb.	coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

Base per Lb.

All widths up to 24 in.,	P'gh	1.85c.
All widths up to 24 in.,	Chicago	1.95c.
All widths up to 24 in.,	del'd Detroit	2.05c.
All widths up to 24 in.,	Birmingham	2.00c.
Cooperage stock,	Pittsburgh	2.10c.
Cooperage stock,	Chicago	2.20c.

Cold-Rolled Strips

Base per Lb.

F.o.b.	Pittsburgh	2.60c.
F.o.b.	Cleveland	2.60c.
Del'd	Chicago	2.88c.
F.o.b.	Worcester	2.80c.

Fender Stock

No. 14,	Pittsburgh or Cleveland	2.90c.
No. 14,	Worcester	3.30c.
No. 20,	Pittsburgh or Cleveland	3.30c.
No. 20,	Worcester	3.70c.

Hot-Rolled Rail Steel Strips

Base per Lb.

F.o.b.	Pittsburgh	1.70c.
F.o.b.	Chicago	1.75c.
F.o.b.	Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

	To Manufacturing Trade	*Per Lb.*
Bright wire		2.30c.
Spring wire		2.90c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

	Base per Keg
Standard wire nails	$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10

	Base per 100 Lb.
Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh, while Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

On staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel Inches	Black	Galv.	*Wrought Iron* Inches	Black	Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	53½	35	¼ & ⅜	+11½	+31½
½	58½	47	½	31½	15
¾	62	52	¾	36½	20½
1 to 3	64	55	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	60	51	2	37	22½
2½ to 3	63	54	2½ to 3½	38	25
3½ to 6	65	56	4 to 8	40	28½
7 and 8	64	54	9 to 12	38	24½
9 and 10	63½	53½			
11 and 12	62½	52½			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	51	38	¼ & ⅜	+2½	+34½
½	56½	47½	½	32½	17½
¾	61	52	¾	37½	22½
1 to 3	63	55	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2½ to 3	62	54	2½ to 4	45½	33
3½ to 6	65½	57½	4½ to 6	45	33½
7 and 8	64½	54½	7 & 8	46	33
9 and 10	63½	53½	9 to 12	41½	30
11 and 12	62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

			Cold Drawn	Hot Rolled
1 in. o.d.	13	B.W.G.	$ 8.60	$7.32
1¼ in. o.d.	13	B.W.G.	10.19	9.36
1½ in o.d.	13	B.W.G.	11.26	10.32
1¾ in. o.d.	13	B.W.G.	12.81	11.64
2 in. o.d.	13	B.W.G.	14.35	13.04
2¼ in. o.d.	13	B.W.G.	16.00	14.54
2½ in. o.d.	12	B.W.G.	19.29	17.54
2¾ in. o.d.	12	B.W.G.	20.45	18.59
3 in. o.d.	12	B.W.G.	21.45	19.50
3¼ in. o.d.	11	B.W.G.	25.22	22.93
3½ in. o.d.	11	B.W.G.	27.09	24.62
4 in. o.d.	10	B.W.G.	33.60	30.54
4½ in. o.d.	10	B.W.G.	41.08	37.35
5 in. o.d.	9	B.W.G.	51.56	46.87
6 in. o.d.	7	B.W.G.	79.15	71.96

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
10,000 lb. or ft. to 24,999 lb. or ft.	12½%
2,000 lb. or ft. to 9,999 lb. or ft.	25 %
Under 2,000 lb. or ft.	40 %

Hot-Finished Lapweld Steel Pressure Tubes

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

1½	in. o.d	13	B.W.G. $ 9.72
1¾	in. o.d.	13	B.W.G. 11.06
2	in. o.d.	13	B.W.G. 12.33
2¼	in. o.d.	13	B.W.G. 13.79
2½	in. o.d.	12	B.W.G. 16.53
2¾	in. o.d.	12	B.W.G. 17.54
3	in. o.d.	12	B.W.G. 18.35
3¼	in. o.d.	11	B.W.G. 21.58
3½	in. o.d.	11	B.W.G. 23.15
4	in. o.d.	10	B.W.G. 28.66
4½	in. o.d.	10	B.W.G. 35.22
5	in. o.d.	9	B.W.G. 44.35
6	in. o.d.	7	B.W.G. 68.14

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5 %
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½%
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25 %
Under 2,000 lb. or ft.	plus 40 %

CHARCOAL IRON BOILER TUBES

Base Discounts, f.o.b. Pittsburgh

In. O. D.	
1½ and 1¾	44
2 —2¼	13 and 10
2½—2¾	16 and 10
3	17 and 10
3¼—3½	18 and 10
4	20 and 10
4½, 5, 6	21 and 10

Extras for quantity: For 1½ to 1¾, up 8 points under 10,000 lb., up 4 points 10,000 lb. to carload. For 2 in. to 5½ in., up 2 points without supplementary 10 per cent, under 10,000 lb.; supplementary 5 per cent instead of supplementary 10 per cent for 10,000 lb. to carload.

In sizes 2 in. to 4½ in. O.D. inclusive, all tubes more than four gages heavier than standard are priced per lb. as follows: Carload and over, 9c.; extras for quantity—under 10,000 lb. 1c. per lb., 10,000 lb. to carload ½c. per lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$47.00
4-in., del'd Chicago	50.00
6-in. and larger, del'd New York	45.00
4-in. del'd New York	48.00
6-in. and larger, Birmingham	39.00
4-in. Birmingham	42.00

Class "A" and gas pipe, $3 extra

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Tie plates, Pacific Coast ports	2.00
Track bolts, to steam railroads	2.53
Track bolts, no jobbers, all sizes (per 100 count)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va., Jersey City, N. J.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts .....70, 10 and 10
Carriage bolts .....70, 10 and 10
Lag bolts .....70, 10 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads .....70, 10 and 10
Hot-pressed nuts, blank or tapped, square .....70, 10 and 10
Hot-pressed nuts, blank or tapped, hexagons .....70, 10 and 10
C.p.c. and t. square or hex. nuts, blank or tapped .....70, 10 and 10
Semi-finished hexagon nuts, U.S.S. all sizes .....70, 10 and 10
Semi-finished hexagon nuts, S.A.E. ¼ in. to 7/16 in. diameter.75, 10 and 10
½ in. to 1 in. diameter..75, 10 and 10
larger than 1 in. diameter.75, 10 and 10
Stove bolts 11 packages, Pittsburgh..75
Stove bolts in packages, Chicago.....75
Stove bolts in packages, Cleveland....75
Stove bolts in bulk, P'gh.....83
Stove bolts in bulk, Chicago.....83
Stove bolts in bulk, Cleveland.....83
Tire bolts .....60 and 10

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....$2.90
F.o.b. Chicago 3.00
F.o.b. Birmingham 3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70 and 5
F.o.b. Cleveland .....70 and 5
F.o.b. Chicago and Birm'g'm....70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller .....80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller.....75
Milled headless set screws, cut thread ¾ in. and smaller 75
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller 85
Unset set screws, cut and oval point .....75 and 10 to 80
Milled studs .....65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Uncropped.....$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is $52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base.....2.45c.
Delivered price at Detroit is.....2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel....	base
6100 Chromium Vanadium Bar..	1.20
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium ...	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C)

(Base Prices, f.o.b. Pittsburgh)

Per Lb.

Forging billets .....19.55c.
Rerolling slabs .....15c.
Bars .....23c.
Plates .....26c.
Structural shapes .....23c.
Sheets .....33c.
Hot-rolled strip .....20¾c.
Cold-rolled strip .....27c.
Drawn wire .....23c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Uncropped.....$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham.
Uncropped.....$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Per Gross Ton

Rerolling $27.00
Forging quality 32.00

Delivered Detroit

Rerolling $30.00
Forging 35.00

Billets Only F.o.b. Duluth

Rerolling $29.00
Forging 34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer.....$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved .....1.70c.
Universal .....1.70c.
Sheared .....1.70c.

Tube Rounds

Base per Lb.

F.o.b. Pittsburgh .....1.80c.
F.o.b. Chicago .....1.85c.
F.o.b. Cleveland .....1.85c.
F.o.b. Buffalo .....1.90c.
F.o.b. Birmingham .....1.95c.

Wire Rods

(Common, base)

Per Gross Ton

F.o.b. Pittsburgh $38.00
F.o.b. Cleveland 38.00
F.o.b. Chicago 39.00
F.o.b. Anderson, Ind. 39.00
F.o.b. Youngstown 39.00
F.o.b. Worcester, Mass. 40.00
F.o.b. Birmingham 41.00
F.o.b. San Francisco 47.00
F.o.b. Galveston 44.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	.....	.....	19.00	.....
Sparrows Point, Md.	19.50	.....	19.00	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	.....
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	.....
Duluth, Minn.	19.00	19.00	.....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn From East Pa. or Buffalo.....	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J. From East. Pa. or Buffalo....	20.89	21.39	20.39	21.89
Philadelphia From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio From Hamilton, Ohio.....	20.50	20.50	.....	.....
Mansfield, Ohio From Cleveland and Toledo...	20.26	20.26	.....	.....
Indianapolis From Hamilton, Ohio.....	20.77	20.77	.....	.....
South Bend, Ind. From Chicago	20.55	20.55	.....	.....
Milwaukee From Chicago	19.50	19.50	.....	.....
St. Paul From Duluth	20.94	.....	.....	.....
Davenport, Iowa From Chicago	20.26	20.26	.....	.....
Kansas City From Granite City	21.04	21.04	.....	.....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....$23.50
Johnson City, Tenn. 23.50
Del'd Chicago 29.15

GRAY FORGE PIG IRON

Valley furnace $18.00
Pittsburgh district furnace 18.00

CHARCOAL PIG IRON

Lake Superior furnace $21.00
Delivered Chicago 24.04
Delivered Buffalo 24.28

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75.....$21.00
No. 2 fdy., sil. 1.75 to 2.75.....20.50
Malleable 21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....$22.50
No. 2 fdy., sil. 1.75 to 2.25.....22.00
Malleable 22.50
Basic 22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $85.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $77.50
50% (ton lots) 85.00
75% (carloads) 126.00
75% (ton lots) 136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid).... 31.00
14% to 16% (less carloads)..... 38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads .....$1.35 to $1.45
Ferrotungsten, less carloads. 1.45 to 1.55
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads .....10.00c.
Ferrochromium, 2% carbon .....16.50c. to 17.00c.
Ferrochromium, 1% carbon .....17.50c. to 18.00c.
Ferrochromium, 0.10% carbon .....19.50c. to 20.00c.
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V.....$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton $137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage..... 50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage..... 65.00
Ferromolybdenum, per lb. Mo., del. 95c.
Calcium molybdate, per lb. Mo., del. .....80c.
Silico spiegel, per ton, f.o.b. furnace, car lots $38.00
Ton lots or less per ton..... 45.50
Silico-manganese, gross ton, delivered:
2.50% carbon grade 90.00
2% carbon grade 95.00
1% carbon grade 105.00
Spot prices .....$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$13.00 to $13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 2 railroad wrought	13.00 to 13.50
Scrap rails	13.00 to 13.50
Rails 3 ft. and under	14.50 to 15.00
Compressed sheet steel	12.75 to 13.25
Hand bundled sheet steel	11.50 to 12.00
Hvy. steel axle turnings	10.00 to 10.50
Machine shop turnings	9.00 to 9.50
Short shov. turnings	9.00 to 9.50
Short mixed borings and turnings	5.25 to 5.75
Cast iron borings	5.25 to 5.75
Cast iron carwheels	12.00 to 12.50
Heavy breakable cast	11.50 to 12.00
No. 1 cast	12.50 to 13.00
Railr. knuckles and couplers	15.50 to 16.00
Rail. coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	15.00 to 15.50
Low phos. plate scrap	13.50 to 14.00
Low phos. punchings	14.00 to 14.50
Steel car axles	14.00 to 14.50

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel	$9.75 to $10.25
Automobile hvy. melt. steel	8.50 to 9.00
Shoveling steel	9.75 to 10.25
Hydraulic comp. sheets	8.75 to 9.25
Drop forge flashings	8.50 to 9.00
No. 1 busheling	8.50 to 9.00
Rolled carwheels	11.00 to 11.50
Railroad tires	11.00 to 11.50
Railroad leaf springs	11.00 to 11.50
Axle turnings	9.00 to 9.50
Steel couplers and knuckles	11.00 to 11.50
Coil springs	11.50 to 12.00
Axle turnings (elec. fur.)	9.00 to 9.50
Low phos. punchings	11.50 to 12.00
Low phos. plates, 12 in. and under	11.50 to 12.00
Cast iron borings	5.75 to 6.25
Short shoveling turnings	5.75 to 6.25
Machine shop turnings	5.00 to 5.50
Rerolling rails	10.50 to 11.00
Steel rails, less than 3 ft.	11.50 to 12.00
Steel rails, less than 2 ft.	12.50 to 13.00
Angle bars, steel	10.50 to 11.00
Cast iron carwheels	10.50 to 11.00
Railroad malleable	10.50 to 11.00
Agricultural malleable	8.50 to 9.00

Per Net Ton

Iron car axles	$14.00 to $14.50
Steel car axles	14.00 to 14.50
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.75 to 9.25
No. 2 busheling	5.00 to 5.50
Locomotive tires, smooth	9.50 to 10.00
Pipe and flues	5.00 to 5.50
No. 1 machinery cast	9.50 to 10.00
Clean automobile cast	9.50 to 10.00
No. 1 railroad cast	8.00 to 8.50
No. 1 agricultural cast	8.00 to 8.50
Stove plate	5.25 to 5.75
Grate bars	5.25 to 5.75
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.50 to $11.00
No. 2 heavy melting steel	9.00 to 9.50
No. 1 railroad wrought	11.00 to 11.50
Bundled sheets	9.00
Hydraulic compressed, new	10.00 to 10.50
Hydraulic compressed, old	6.50 to 7.00
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	8.50 to 9.00
Cast borings	5.00 to 5.50
Heavy breakable cast	10.00 to 10.25
Stove plate (steel works)	8.50 to 9.00
No. 1 low phos. heavy	13.00 to 14.00
Couplers and knuckles	13.00 to 13.50
Rolled steel wheels	13.00 to 13.50
No. 1 blast furnace	5.00 to 5.50
Spec. iron and steel pipe	8.00
Shafting	16.50 to 17.00
Steel axles	16.50 to 17.00
No. 1 forge fire	9.00
Cast iron car wheels	11.50 to 12.00
No. 1 cast	10.50 to 11.50
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$7.75 to $8.25
Scrap rails for melting	9.00 to 9.50
Loose sheet clippings	4.50 to 5.00
Bundled sheets	6.50 to 7.00
Cast iron borings	5.00 to 5.50
Machine shop turnings	5.00 to 5.50
No. 1 busheling	6.50 to 7.00
No. 2 busheling	3.25 to 3.75
Rails for rolling	9.50 to 10.00
No. 1 locomotive tires	9.00 to 9.50
Short rails	12.00 to 12.50
Cast iron carwheels	8.50 to 9.00
No. 1 machinery cast	9.75 to 10.25
No. 1 railroad cast	9.00 to 9.50
Burnt cast	6.50 to 7.00
Stove plate	6.50 to 7.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	8.75 to 9.25

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting steel	9.50 to 10.00
Compressed sheet steel	10.00 to 10.50
Light bundled sheet stampings	7.50 to 8.00
Drop forge flashings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Short shoveling turnings	7.00 to 7.50
No. 1 busheling	9.00 to 9.50
Steel axle turnings	9.00 to 9.50
Low phos. billet crops	14.00 to 14.50
Cast iron borings	7.00 to 7.50
Mixed borings and short turnings	7.00 to 7.50
No. 2 busheling	7.00 to 7.50
No. 1 cast	11.50 to 12.00
Railroad grate bars	7.00 to 7.50
Stove plate	7.25 to 7.50
Rails under 3 ft.	14.50 to 15.00
Rails for rolling	15.50 to 18.00
Railroad malleable	11.50 to 12.00
Cast iron carwheels	10.25 to 10.75

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting scrap	8.75 to 9.25
Scrap rails	9.50 to 10.00
New hydraul. comp. sheets	8.75 to 9.25
Old hydraul. comp. sheets	7.50 to 8.00
Drop forge flashings	8.75 to 9.25
No. 1 busheling	8.75 to 9.25
Hvy. steel axle turnings	6.50 to 7.00
Machine shop turnings	5.00 to 5.50
Knuckles and couplers	12.00 to 12.50
Coil and leaf springs	12.00 to 12.50
Rolled steel wheels	12.00 to 12.50
Low phos. billet crops	11.75 to 12.25
Short shov. steel turnings	5.50 to 6.00
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
No. 2 busheling	5.00 to 5.50
Steel car axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 machinery cast	11.00 to 11.50
No. 1 cupola cast	9.00 to 9.50
Stove plate	8.75 to 9.25
Steel rails, 3 ft. and under	12.00 to 12.50
Cast iron carwheels	10.00 to 10.50
Industrial malleable	11.00 to 12.00
Railroad malleable	11.00 to 12.00
Chemical borings	7.00 to 7.50

BOSTON

Dealers' buying prices per gross ton:

*No. 1 heavy melting steel	$7.75 to $8.00
No. 1 heavy melting steel	6.25 to 6.80
Scrap T rails	6.50 to 6.80
*No. 2 steel	6.50 to 6.75
No. 2 steel	5.25 to 5.50
Breakable cast	6.00 to 6.50
Machine shop turnings	2.25 to 2.50
Bundled skeleton, long	5.00 to 5.25
Forge flashings	5.00 to 5.25
Shafting	11.50 to 12.00
Steel car axles	11.25 to 11.75
Cast iron borings, chemical	6.00 to 7.00
Stove plate	4.00 to 4.25

Per gross ton delivered consumers' yards:

Textile cast	$9.00 to $9.50
No. 1 machinery cast	9.00 to 9.50
Stove plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

*Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	*$7.00	†8.50
No. 2 heavy melting steel	*5.50 to	†7.00
Heavy breakable cast	6.25 to	6.75
No. 1 machinery cast	7.25 to	7.75
No. 2 cast	6.50 to	7.00
Stove plate	5.75 to	6.25
Steel car axles	12.50 to	13.00
No. 1 railroad wrought	7.50 to	8.00
No. 1 yard wrought, long	6.50 to	7.00
Spec. iron and steel pipe	4.50 to	5.00
Forge fire	5.50 to	6.00
Rails for rolling	9.00 to	9.50
Short shoveling turnings	2.50 to	3.00
Machine shop turnings	2.50 to	3.00
Cast borings	3.50 to	3.75
No. 1 blast furnace	2.00 to	2.50
Cast borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	4.00 to	4.50

Per gross ton, delivered local foundries:

No. 1 machinery cast	$10.50
No. 1 hvy. cast (cupola size)	9.50
No. 2 cast	8.00

*For direct car loading only.
†Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$9.00
Scrap steel rails	10.00
Short shoveling turnings	6.50
Stove plates	6.50
Steel axles	10.00 to 10.50
Iron axles	10.00 to 10.50
No. 1 railroad wrought	6.50
Rails for rolling	11.00 to 12.00
No. 1 cast	9.50 to 10.00
Tramcar wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$8.75 to $9.25
No. 1 heavy melting	8.00 to 8.50
No. 2 heavy melting	6.50 to 7.00
No. 1 locomotive tires	9.50 to 10.00
Misc. stand-sec. rails	9.25 to 9.75
Railroad springs	10.50 to 11.00
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	2.50 to 3.00
Rails for rolling	9.50 to 10.00
Machine shop turnings	2.50 to 3.00
Heavy turnings	5.50 to 6.00
Steel car axles	11.75 to 12.25
Iron car axles	13.00 to 13.50
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	11.75 to 12.25
Steel angle bars	9.50 to 10.00
Cast iron carwheels	7.00 to 7.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$8.50 to $9.00
Borings and short turnings	5.25 to 5.75
Long turnings	$4.50 to $5.00
No. 1 machinery cast	10.00 to 10.50
Automotive cast	10.50 to 11.00
Hydraul. comp. sheets	9.00 to 9.50
Stove plate	6.25 to 6.75
New factory busheling	7.50 to 8.00
Old No. 2 busheling	4.50 to 5.00
Sheet clippings	5.00 to 5.50
Flashings	7.50 to 8.00
Low phos. plate scrap	9.25 to 9.75

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	4.00
Axles wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algeria	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, aver. 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½	20c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered*	$17.50 to $18.50
Tungsten, domestic scheelite, delivered†	17.00

Per Gross Ton

Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†Nominal; no supplies available.

Fluorspar

Per Net Ton

Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	$15.50 to $16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$15.50 to 16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville Prompt	$3.85
Foundry, f.o.b. Connellsville Prompt	$4.60 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.31
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	$9.25
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	$1.80 to $2.00
Mine run coking coal f.o.b. W. Pa.	2.05 to 2.25
Gas coal, ¾-in. f.o.b. Pa. mines	2.25 to 2.50
Mine run gas coal f.o.b. Pa. mines	2.05 to 2.40
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.60
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	3.85c.
No. 5 industrial fuel oil	3.35c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.00c.

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

	High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	45.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

Per Net Ton

Standard size	$45.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

Per Net Ton

Standard size, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa.	45.00
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	*3.45c.
Squares and flats	*3.45c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 count,	65 per cent off list.
Carriage bolts, 100 count,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70
Wire, galv. soft, base per 100 lb.	*2.925
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head cap screws	50
Cup point set screws	70 and 10
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	3.05
Cement c't'd nails, base per keg	3.05

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

NEW YORK

	Base per Lb
Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.22c.
Iron bars	3.22c.
Iron bars, swed. charcoal	6.50c to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-rolled; strip, soft and quarter hard	3.32c.
Hoops	3.52c.
Bands	3.52c.
Hot-rolled sheets (No. 10)	3.27c.
Hot-rolled ann'l'd sheets (No. 24*)	3.85c.
Galvanized sheets (No. 24*)	4.50c.
Long terne sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.25c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x ⅛ in. and larger	3.65c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21
	Per Cent
Machine bolts, cut thread:	Off List
All diameters	70
Carriage bolts, cut thread:	
All diameters	70
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.09c.
Galv. sheets (No. 24)	4.79c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.09c.
*Galv. corrug. sheets	4.79c.
Structural rivets	3.99c.
Boiler rivets	4.09c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts:	
1000 lb. or over	70 and 10
200 to 999 lb.	67½ and 10
100 to 199 lb.	65 and 10
Less than 100 lb.	60 and 10

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.95c.
*Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
‡Reinforc. steel bars, sq. twisted and deformed	2.955c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.55c.
†Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	*2.10c.
Cold-finished steel bars	3.40c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras.

†Outside delivery 10c. less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.25c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.45c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.70c.
Hot-rolled sheets (No. 10)	3.20c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.91
Com. wire nails, base per keg (1 to 24 kegs)	3.50
25 to 50 kegs	3.30
Larger quantities	3.10
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$19.03
4-in.	44.96
Lap-welded steel boiler tubes, 2-in.	18.10
4-in.	42.32

BUFFALO

	Base per Lb.
Plates	3.27c.
Struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.62c.
Galv. sheets (No. 24)	4.70c.
Bands	3.42c.
Hoops	3.42c.
Hot-rolled unannealed sheets	3.17c.
Com. wire nails, base per keg	$3.25
Black wire, base per 100 lb.	3.55c.

BOSTON

	Per Lb. Base
Beams, channels, angles, tees, zees	3.52c.
H beams and shapes	3.52c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.53c.
Floor plates, diamond pattern	5.33c.
Bar and bar shapes (mild steel)	3.30c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.60c. to 4.60c.
Half rounds, half ovals, ovals and bevels	4.55c.
Tire steel	4.55c.
Cold-finished rounds and hexagons	5.25c.
Cold-rolled strip steel	3.245c.
Cold-finished squares and flats	4.30c.
Blue annealed sheets, No. 10 gal.	3.60c.
One pass cold-rolled sheets No. 24 ga.	4.15c.
Galvanized steel sheets, No. 24 ga.	4.85c.
Lead coated sheets, No. 24 ga.	5.80c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.70c.	3.55c.
Shapes, standard	3.55c.	3.70c.	3.55c.
Soft steel bars	3.60c.	3.70c.	3.60c.
Reinforcing bars	3.50c.	3.50c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.45c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.80c.	3.75c.
Galv. sheets (No. 24)	5.00c.	5.05c.	5.00c.
Cold finished steel:			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg less carload	$3.40	$3.25	$3.30

All items subject to differentials for quantity.

Trade Expansion Promised By Barter Arrangements

A BARTER operation in trade with Germany has just been closed by the Sun Oil Co., Philadelphia. In return for lubricating oils from that country, the Sun company will receive 3750 tons of 6-in. steel pipe from Germany. The pipe will be used to construct a 100-mile gasoline pipe line from Marcus Hook, Pa., to tidewater on the north New Jersey coast, and shipment will begin about Jan. 1.

Officials of the Sun company have explained that, through its lubricant trade in Germany, it had accumulated a considerable credit, which could not be liquidated because of German restrictions on foreign exchange. The barter transaction was accordingly negotiated. It opens the way to an industrial development which will give employment not only in laying the pipe line, but in producing and installing pumping machinery, storage plants and other equipment of the pipe line.

The possibilities of direct barter as a means of rehabilitating American foreign trade, and, in general, of bringing about a resumption of international trade movements, have been discussed ever since the depression began. When the Export-Import Bank was set up, under the directorship of George N. Peek, with a generous allocation of RFC capital, there was a momentary revival of interest, but the practical difficulties of barter proved serious.

Recently, however, there have been indications that these obstacles can in some cases be overcome. It was announced some time ago that a deal for the exchange of probably $30,000,000 of American cotton for a line of German products had been practically closed, the Export-Import Bank having assisted in arranging the transaction. The Sun company's recent deal offers further hope that additional business may be done with resultant trade benefits.

Negotiations for Steel Truce Still Under Way

WASHINGTON, Dec. 11.—It was unofficially reported here today that Myron C. Taylor, chairman of the United States Steel Corpn., will confer in Washington tomorrow with the National Steel Labor Relations Board and make further efforts for a truce between the steel industry and the Amalgamated Association of Iron, Steel and Tin Workers. It also is reported that the industry during the past week made another offer to the association but that the association rejected it.

December Copper Sales Averaging Well Above Corresponding November Figures

Lead Market Strong With Premiums Obtainable on Some Grades—Moderate Increase in Zinc Stocks Reported for November—Tin Quiet

NEW YORK, Dec. 11.—Sales so far this month have averaged nearly 1000 tons a day, with last week's bookings having totaled 5500 tons. This is a considerable improvement over business in the corresponding November period and indicates that consumers' stocks have been reduced to a point at which additional purchases are constantly necessary. Buyers also appear to have more confidence in the holding of the Blue Eagle price of 9c. a lb., delivered Connecticut Valley, which has been quoted since the inception of the code. The European situation shows little change, with quotations this week ranging from 6.90c. to 7c. a lb., usual Continental base ports. Plans for market control abroad seem to be going forward and a meeting between United States and European interests is expected to be held here about Jan. 15. At that time it is likely that disposition of surplus Canadian copper will also be seriously considered.

Tin

Despite reports of sizable transactions having been negotiated quietly during the past week, the market has been superficially dull with prices hovering around the 51c. level. The current advance in tin plate operations is not viewed as significant because of the usual practice of a number of mills of boosting production prior to the holidays to give employees larger Christmas pay envelopes. Current tin plate output is at 45 per cent of capacity. Straits metal was quoted in New York today at 51.05c. a lb., while the London market on first call was £228 5s. and £228 10s. for spot and future standard respectively. At Singapore, tin was quoted at £231 2s. 6d.

Lead

The market is unusually firm at unchanged prices and one large interest is having little difficulty securing a premium on its sales of certain brands in the East. The current quotations of 3.35c. a lb., St. Louis, and 3.50c., New York, have now been effective for more than two weeks and many believe that higher prices are in prospect. December metal is now largely sold and fairly heavy January bookings are reported. The ore market is firm at $32 a ton, and, although output is running ahead of both sales and shipments, suspension of operations during the two holiday weeks will prevent possible overproduction.

Zinc

Despite the relatively unfavorable November statistics, this market continues rather firm at 3.70c. and 4.05c. a lb., respectively, East St. Louis and New York. This situation is attributable to several factors, including the comparatively strong demand, the reluctance of producers to make sales in view of prospective curtailment in output, and a rise in the concentrates market at Joplin. Following publication of the November statistics, which showed an increase in stocks of more than 5000 tons, representatives of smelting interests held an informal meeting to discuss curtailment. Although no definite decision was reached, the problem will unquestionably be attacked later. Sales of Prime Western last week amounted to about 4300 tons, compared with 7500 tons in the preceding period, and demand is still sustained. The comparatively well sold position of the market was indicated by an increase of more than 12,000 tons in unfilled orders during November. The month's actual increase in stocks was 5049 tons. Production was 35,003 tons, while shipments amounted to only 29,954 tons. The Joplin ore market advanced $1 a ton on Saturday, the flotation grade having sold at $25 a ton and mill material at $26. Sales totaled about 5000 tons during the week, compared with production of 8200 tons and shipments of 8400 tons.

Ingot Brass and Bronze

The Non-Ferrous Ingot Metal Institute reports that, in the 28-day period ended Nov. 30, the average prices paid for commercial 80-10-10 and commercial 85-5-5-5 brass ingots were 9.864c. a lb. and 8.278c. a lb. respectively, compared with 9.806c. and 8.278c. in the preceding four-week period.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 5	Dec. 6	Dec. 7	Dec. 8	Dec. 10	Dec. 11
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, New York	50.95	51.10	50.95	....	51.05	51.05
Zinc, East St. Louis	3.70	3.70	3.70	3.70	3.70	3.70
Zinc, New York	4.05	4.05	4.05	4.05	4.05	4.05
Lead, St. Louis	3.35	3.35	3.35	3.35	3.35	3.35
Lead, New York	3.50	3.50	3.50	3.50	3.50	3.50

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, virgin 99 per cent plus, 19c. to 22c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 14c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 13.75c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	52.50c. to 53.50c.
Tin, bar	54.50c. to 55.50c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.25c.
*Seamless brass tubes	16.00c.
*Seamless copper tubes	16.25c.
*Brass rods	12.75c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.37½c. to 5.37½c.
Lead, bar	5.37½c. to 6.37½c.
Lead, sheets	7.25c.
Antimony, Asiatic	15.50c. to 16.50c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.50c.
Tin, bar	57.50c.
Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.50c. to 4.75c.
Lead, bar	7.75c.
Antimony, Asiatic	15.75c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.50c.
Solder, ½ and ½	33.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.50c.	6.25c.
Copper, hvy. and wire	5.37½c.	5.87½c.
Copper, light and bottoms	4.37½c.	4.87½c.
Brass, heavy	2.87½c.	3.50c.
Brass, light	2.12½c.	2.87½c.
Hvy. machine composition	4.37½c.	4.87½c.
No. 1 yel. brass turnings	3.75c.	4.25c.
No. 1 red brass or compos. turnings	4.00c.	4.50c.
Lead, heavy	2.62½c.	3.00c.
Zinc	1.87½c.	2.25c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.

More Code Budgets Submitted—Other NRA News

(Concluded from Page 40)

that any criticisms of, objections to or suggestions concerning the budget and the proposed basis of contribution must be submitted to Acting Deputy Administrator Dexter A. Tutein prior to Dec. 27.

PLAIN WASHER

A trade practice appendix to the code for the fabricated metal products manufacturing and metal finishing and metal coating industry has been submitted by the plain washer manufacturing subdivision of the industry. Suggestions or objections concerning the appendix must be submitted before Dec. 28 to Deputy Administrator H. Ferris White, 1518 K Street, Washington.

CODE AUTHORITIES NAMED

The National Industrial Recovery Board has announced approval of the following members of code authorities:

Fabricated Metal Products Manufacturing and Metal Finishing and Metal Coating Industry: H. S. Kimball, secretary-treasurer, Fabricated Metal Products Federation, Washington; L. D. Bement, American Cutlery Mfrs. Assn., Greenfield, Mass.; G. B. Durell, American Fork and Hoe Co., Cleveland; W. D. Disston, Henry Disston & Sons, Inc., Philadelphia; A. M. Ferry, Ferry & Dawson Wire Cloth Mfrs. Assn., Washington; D. S. Hunter, D. S. Hunter & Associates, Cleveland; H. D. North, Ferry Cap & Set Screw Co., Cleveland; A. E. Payson, American Thermos Bottle Co., Norwich, Conn.; R. W. Staud, Porcelain Enamel Institute, Chicago; W. M. Goss, Scoville Mfg. Co., Waterbury, Conn.; A. J. Kieckhefer, National Enameling & Stamping Co., Milwaukee, and Lt. Col. C. C. Oakes, War Department, Washington, Government representative.

Tool and Implement Manufacturing Industry (Division of fabricated metal products industry): M. A. Coe, Stanley Rule & Level Co., New Britain, Conn.; A. C. Haeffner, David Wadsworth & Son, Auburn, N. Y.; A. E. Newton, Collins Co., Collinsville, Conn.; H. W. Conarro, Warren Axe & Tool Co., Warren, Pa.; R. Harte, Ames-Baldwin-Wyoming Co., Parkersburg, W. Va.; G. B. Durell, American Fork & Hoe Co., Cleveland, and S. S. Vaughan, Vaughan & Bushnell Mfg. Co., Chicago.

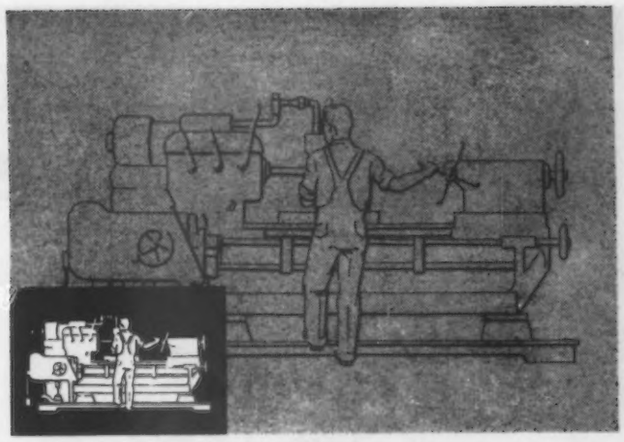
Weirton Employees to Select Representatives

WEIRTON, W. VA., Dec. 10.—Workers in the three plants of the Weirton Steel Co. today will nominate candidates for representatives under their employee plan of representation. At a general election on Dec. 14, 49 representatives will be elected to speak for the employees in dealing with the company during 1935.

It is estimated that approximately 10,000 employees will be eligible to participate in the election under the by-laws of the representation plan. All details of the voting are completely in the hands of employees.

This election is the third since the inauguration of the plan in June, 1933, representatives chosen at the first election having served for a six-months period only. Under the rules of the representation plan, any one, whether or not an employee of the Weirton company, may be elected as a representative.

The employee representatives consider and act upon all matters connected with the relationships between employees and the company. At a recent meeting the general committee of the representatives reported that between Jan. 1 and Nov. 15, 1934, 572 cases were formally handled by the representatives. Of these, 347 were settled in favor of the employees; 77 against the employees; 24 were withdrawn, and 30 were compromised. The number of employees affected by the various cases range from one to a substantial number.



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COLD DRAWN STEELS
reduce machining costs

If your problem involves the rapid duplication of machined steel parts at lowest cost, WYCKOFF Cold Drawn Steels will serve you well.

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WYCKOFF DRAWN STEEL COMPANY
General Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of
Cold Drawn Steels
Turned and Polished Shafting Turned and Ground Shafting

Railroad Equipment

Piraeus-Athens-Peloponnesus Railroad is negotiating a loan from the Greek government for roadbed improvements and purchase of rolling stock. Equipment under consideration consists of six locomotives with tenders, seven motor rail cars, 108 steel box cars, eight passenger coaches, and about 10 baggage cars. Georges J. Doumas, Athens, Greece, is general manager of the railroad.

RAILS

Northern Pacific has ordered 10,000 tons of rails divided as follows: 6000 tons to Illinois Steel Co., 3500 tons to Bethlehem Steel Co. and 500 tons to Colorado Fuel & Iron Co.

Pipe Lines

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 18 for steel pipe; also for steel tubing (Schedule 3894) for Eastern and Western navy yards.

Tower Oil Co., Cincinnati, I. Levenson, 607 Mitchell Avenue, president, plans two 6-in. steel pipe lines near bulk oil station, Cullums Ripple, Ohio River, for service from river barges. Roy Moore, Elmwood, Ohio, is company architect.

Marble Falls, Tex., asks bids until Dec. 27 for 13,500 ft. of 4, 6 and 8-in. steel pipe; also for 12,000 ft. of 1 and 2-in. galvanized steel pipe for water supply. H. R. F. Helland, Frost National Bank Building, San Antonio, Tex., is consulting engineer.

Pennsylvania Railroad Co., Philadelphia, closed bids Dec. 12 for quantity of steel pipe (Contract 20-1934).

Latonia Refining Co., Latonia, Ky., plans four 16-in. welded steel pipe lines, totaling 10,000 ft., for crude oil supply for local refinery and other oil service. Company headquarters are in Midland Bank Building, Cleveland.

Ogden, Utah, will soon take bids for steel pipe, with alternate bids on cast-iron pipe, for new Wheeler Creek water supply line. Cost about $14,000.

Amory Gas Co., Amory, Miss., plans welded steel pipe trunk line from point near Amory to connection with pipe line system of Southern Natural Gas Co. at West Point, Miss., for natural gas supply at Amory, Tupelo and Aberdeen, Miss., where local distribution lines will be installed. Cost over $125,000. G. H. DeSpain is general manager.

Portland, Ore., 180 tons, 6-in. steel pipe for Oceandale Water District; bids under advisement.

San Francisco, 320 tons of tubing and wrought steel pipe for enlargement of O'Shaughnessy dam; bids Jan. 8.

Ensley Rail Mill Resumes for Short Run

BIRMINGHAM, Dec. 11.—Pig iron demand is still mostly confined to small, spot orders. With the Christmas holidays and inventories ahead, buying is being more closely restricted to actual current requirements. Books are now open for the first quarter, with the price $14.50, the same as for current tonnage, but there is little interest and only a few scattered orders have been booked thus far.

Four blast furnaces are operating. Woodward Iron Co., which banked its No. 1 furnace on Nov. 25 for repairs, resumed operations on Dec. 3. The Tennessee company banked its Fairfield No. 6 furnace last week. For the past several weeks this stack had been operating for reheating and rebanking. The Tennessee company still has Fairfield No. 5 in production. Republic Steel and Sloss-Sheffield each have an active stack, completing the total of four.

Cast iron pipe shipments and bookings last week receded a little under the average of the past several months. From now on until the first of the year there will be a decline in shipments as releases are expected to be held up until after Christmas. There is a satisfactory amount of new tonnage in prospect up until about Dec. 20.

The Ensley rail mill of the Tennessee company resumed production Monday and will be in operation for about ten days on several small orders.

Eight open-hearth units will be worked this week, as compared with five last week. The Tennessee company is increasing from five to six at Fairfield, on account of the rail mill. Gulf States Steel, which closed down its open-hearth plant on Nov. 17, fired up two on Saturday.

Current steel tonnage is light, with most new orders in small quantities.

Scrap in General Rise At Cincinnati

CINCINNATI, Dec. 11.—Reacting to stronger sentiment in other areas, the district scrap market has acquired a better tone. Prices on all grades of old material have moved 50c. a ton. Mill buying, however, is for urgent needs and without substantial influence on the market. Dealers, however, are eagerly bidding for material, running quotations steadily upward in anticipation of mill purchases for first quarter. Some scrap is moving on old contracts, but the volume is not great. Yard supplies, as a result of current speculation, are heavier.

Automotive buying of sheets has swelled demand to about 63 per cent of hot mill capacity, the highest rate since June. With several important automobile plants still out of the market, prospects for continued improvement in demand are good. The Ashland and Middletown units of the leading interest are operating near 50 per cent of capacity, while Butler is active largely in the finishing mill.

Spot purchases of pig iron have been moving upward for the past two weeks, bringing weekly averages to between 400 and 500 tons. Shipping orders on current business are all prompt, since quantities are being held to single cars and 100-ton lots. Tonnage orders are lacking, since the price situation is not conducive to anticipatory purchasing. Foundries catering to specialty castings are operating at a better rate, while machine tool and implement melters report light melts. Average foundry operations, however, show a slight upward trend.

Seasonal influence tends to improve by-product foundry coke shipments, but new business is without feature.

Warehouse business is tending slightly downward under seasonal influences. Construction firms are buying little material, current demand being mainly from industrial users.

Cast Iron Pipe

Cook County, Ill., has placed 200 tons for Oak Forest Infirmary with James B. Clow & sons.

Wayne, Mich., has awarded 125 tons to James B. Clow & Sons.

Miller, Mo., closes bids Dec. 21 for 22,000 ft. 2, 4 and 6-in. for water supply; also for 50,000-gal. elevated steel tank and tower, deep-well pumping machinery and other waterworks equipment. Ozark Engineering Co., Court House, Springfield, Mo., is consulting engineer.

Roseville, Cal., will soon take bids for 4000 ft. of 12-in. for trunk line water supply. Cost about $12,800.

Quaker City, Ohio, asks bids at once for water pipe lines, pumping machinery and other waterworks equipment. Fund of $40,000 has been arranged through Federal aid. Burgess & Nipple, 568 East Broad Street, Columbus, Ohio, are consulting engineers.

Mount Vernon, Ga., closed bids Dec. 15 for 7800 ft. of 6 and 8-in., and about 5000 lb. of pipe fittings for water lines. Knox I. Thomas, Standard Building, Atlanta, Ga., is consulting engineer.

Elk City, Okla., plans water pipe lines. Fund of $350,000 is being arranged for this and other waterworks construction. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Baltimore has received low bid from United States Pipe & Foundry Co. for pipe for Bureau of Water Supply, at $28,243, including fittings.

Parowan, Utah, plans water pipe lines, including replacements in present system. Fund of $88,000 is being arranged. Special election has been called for Dec. 17 to approve program. Caldwell & Richards, Templeton Building, Salt Lake City, Utah, are consulting engineers.

St. George, Utah, will take bids soon on 100 tons of 3 and 4-in.

Deer Creek, Okla., plans water pipe line system. Fund of $25,000 has been arranged for this and other waterworks. P. S. Donnell, Oklahoma City, Okla., is consulting engineer.

SPONGE IRON
and
POWDER IRON
for
Metallurgical and Chemical Use

EKSTRAND & THOLAND, INC.
122 E. 42nd ST., NEW YORK CITY
DETROIT - CHICAGO

Medicine Bow, Wyo., received low bid from J. S. Schwartz & Co., Colorado Springs, Colo., for about eight miles of 6-in. for water trunk line from Como wells district to city. Elmer K. Nelson is consulting engineer.

Bazine, Kan., asks bids until Dec. 21 for for water pipe; also for 50,000-gal. storage tank and tower, pumping equipment, etc. Fund of $25,500 has been authorized. Hefling & Hughes Engineering Co., 20 West Second Street, Hutchinson, Kan., is consulting engineer.

Modesto, Cal., divided 119 tons between United States Pipe & Foundry Co. and Grinnell Co.

Santa Monica, Cal., has awarded 227 tons to National Cast Iron Pipe Co.

Williams, Ariz., placed 427 tons through a general contractor.

Hot Springs, Mont., has taken bids on 405 tons of 2 to 8-in.

Mountain House, Idaho, plans water system improvements which include 550 tons of 4 to 8-in.

Steel Output Dips At Buffalo

BUFFALO, Dec. 11.—Pig iron sales are in about the same volume as during the corresponding period in November, but this is unusual inasmuch as sales and shipments ordinarily drop off at this time. Producers have what they say is a substantial market, with no large tonnages moving but a steady volume of small orders. Operations in some classes of foundries have shown notable improvement.

Operations of open-hearth furnaces are down slightly, with Republic Steel Corpn. operating two, the Lackawanna plant of the Bethlehem Steel Corpn., four, and Wickwire-Spencer Corpn., one. The Seneca sheet division of Bethlehem is running about 15 to 20 per cent of capacity. It is probable that some of the mills in the district will be down completely around the period of the 20th to the 1st or the 24th to the 1st, but there is also a strong probability that when they resume, operations will be considerably higher.

A 120-ton highway bridge contract was let to an out-of-town fabricator.

The market for scrap is reasonably brisk. Out-of-town strength is being reflected in this market and there are indications that some sizable purchasing may come along soon. Sales of No. 1 machinery cast at $11 are noted. Dealers are paying as high as $8.75 for new hydraulic compressed sheets and for No. 2 melting steel to fill old orders.

Outlook is Promising In Canada

TORONTO, ONT., Dec. 11.—Both the Canadian National and Canadian Pacific railroads are expected to enter the market for rails and rolling stock. The automotive industry is preparing for heavy production in 1935 and inquiries are out for steel required. Substantial steel and equipment orders from the mining industry will be placed soon so that deliveries can be made immediately after the freeze-up, which has been somewhat delayed this year.

Demand for merchant pig iron is sustained, with orders holding largely to single car lots but aggregating upward of 600 tons per week. Most melters are endeavoring to hold inventories as low as possible during the current season. The daily melt, however, is sustained and averages between 35 and 40 per cent. Pig iron production is holding at a high level for the year, with output mostly in basic for further use of producing companies. Imports are negligible, with only small tonnages reaching Canada from the United States. Prices are firm and unchanged.

With the exception of a slight pick-up in sales, the iron and steel scrap markets are unchanged. Steel mills are taking small tonnage lots of heavy melting steel at irregular intervals, but there is very little call for turnings. Foundries are the principal buyers at this season. No. 1 machinery scrap, which is decidedly scarce, has a steady demand for spot delivery. Stove plate and malleable also are held in small quantity, but demand is limited. Wrought scrap has been among the active grades recently and several good orders are said to have been closed recently. Other lines are spotty. Dealers are out of the market for most lines of scrap and offerings from rural districts have dried up. Price lists remain unchanged.

TOOL STEEL TUBING

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OIL HARDENING
NON-DEFORMING

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CUTTING DIES
SPACERS, BUSHINGS, Etc.

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Cincinnati Chicago Philadelphia

Fabricated Structural Steel

Awards Gain Slightly—New Projects Lower

STRUCTURAL steel lettings, at 5800 tons, compare with 3850 tons last week. Bookings again were mostly in small tonnages, the only sizable award being 1275 tons for a bridge at Alexander, La. New projects of 8100 tons compare with 11,890 tons in the previous week and 10,000 tons two weeks ago. A dam in the Mississippi River at Guttenberg, Iowa, will require 2300 tons, bids on which will be taken Jan. 9. Plate lettings total 1145 tons. New plate projects of 4600 tons include 4100 tons for a unit of the Colorado River aqueduct. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Worcester, Mass., 250 tons, bridge, to Boston Bridge Works, Inc.

Duanesburg, N. Y., 150 tons, bridge for Delaware & Hudson Railroad, to American Bridge Co.

State of New York, 120 tons, highway bridge, to American Bridge Co.

Interlaken, N. Y., 105 tons, Central School, to Smith & Caffrey, Inc.

Westchester County, N. Y., 235 tons, highway bridge, to Harris Structural Steel Co.

New York, 235 tons, lookout galleries for Federal building, to Sexauer & Lemke.

SOUTH AND SOUTHWEST

State of West Virginia, 200 tons, bridges, to Pittsburgh-Des Moines Steel Co.

Belle, W. Va., 165 tons, E. I. duPont de Nemours & Co. plant, to Ingalls Iron Works.

McIntosh County, Okla., 470 tons, bridge, to Capital Steel Co.

Alexandria, La., 1275 tons, bridge, to Nashville Bridge Co.

Boling, Tex., 300 tons, bridge, to McClintic-Marshall Corpn.

CENTRAL STATES

Milwaukee, 120 tons, building for Munkwitz Realty Co., to an unnamed fabricator.

Springfield, Ill., 190 tons, State highway bridge, to McClintic-Marshall Corpn.

Kaufman, Ill., 170 tons, State highway bridge, to McClintic-Marshall Corpn.

Dearborn, Mich., 510 tons, Ford Motor Co. building, to R. C. Mahon Co.

Elk County, Kan., 105 tons, bridge, to St. Joseph Structural Steel Co.

Golden, Colo., 100 tons, Jefferson County bridge, to Minneapolis-Moline Co.

Townsend, Mont., 200 tons, State highway bridge, to Minneapolis-Moline Power Implement Co.

Los Angeles, 200 tons, Jefferson High School, to Virginia Bridge & Iron Co.

Pullman, Wash., 250 tons, science building at State College, to Poole & McGonigle.

Los Angeles, 165 tons, tunnel ribs for Metropolitan Water District, to Commercial Shearing & Stamping Co.

France Field, Canal Zone, 250 tons, two hangars at Army Air Base, general contract to Tucker McClure Co., steel to an unnamed bidder.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Holyoke, Mass., 125 tons, highway bridge.

Medford, Mass., 175 tons, highway bridge.

Pompton Plains, N. J., 550 tons, highway bridge; tenders due Dec. 27.

Cumberland, Md., 290 tons, building for Celanese Corpn.

THE SOUTH

Norfolk & Western Railway, 500 tons, viaduct at Norfolk, Va.

Glasgow, Va., 400 tons, tractor building for Blue Ridge Co.; general contract to John J. Pettijohn Co., Lynchburg, Va.

El Paso, Tex., 425 tons, store.

Meridian, Miss., 250 tons, bridge.

CENTRAL STATES

Gallipolis, Ohio, 2000 tons, temporary piling for Gallipolis Dam; previously reported as 1000 tons; Dravo Contracting Co., Neville Island, Pa., low bidder for general contract.

State of Ohio, 110 tons, Green and Logan County bridges; bids Dec. 22.

Portsmouth, Ohio, 125 tons, post office.

Chicago, 250 tons, store building.

State of Illinois, 1000 tons, four highway bridges.

Springfield, Ill., 400 tons, filtration plant; new bids to be ordered.

Jackson, Mich., 200 tons, city sewage disposal plant.

Guttenberg, Iowa, 2300 tons, dam No. 10 in Mississippi River; bids to be opened Jan. 9 by United States Engineer's Office at Rock Island, Ill.

State of Missouri, 1000 tons, eight highway bridges, including St. Louis County, 500 tons, and Pock County, 100 tons.

WESTERN STATES

Los Angeles, 170 tons, 1.86-mile unit of Colorado River aqueduct for Metropolitan Water District, Specification No. 84, bids Jan. 7.

Monterey County, Cal., 292 tons, State bridge over Burns Creek; bids Dec. 26.

Oakland, Cal., 300 tons additional, County court house; bids taken Dec. 12.

Tobin, Cal., 300 tons, State highway bridge.

FABRICATED PLATE

AWARDS

New York, 650 tons, water main in Central Park, to Alco Products, Inc.

Newberg, Ore., 175 tons, 10-in. welded steel pipe, to Beale Tank & Pipe Co.

Colorado Springs, Colo., 150 tons, plate facing for city dam, to American Bridge Co.

Boulder Dam, Nev., 170 tons, penstocks for power house, to Hendrie & Bolthoff.

Edgemoor, Del., 400 tons, tanks for E. I. du Pont de Nemours & Co., Inc., to Hammond Iron Works.

NEW PROJECTS

Salem, N. J., 150 tons, gas holder.

Los Angeles, 4100 tons, 1.86-mile unit of Colorado River aqueduct for Metropolitan Water District, Specification 84; bids Jan. 7.

San Francisco, 350 tons, enlargement of O'Shaughnessy dam; bids Jan. 8.

The Bureau of Supplies and Accounts, Navy Department, will open bids Dec. 18 on 140 tons of steel tees for three submarines, two to be built at the Portsmouth, N. H., and one at the Mare Island, Cal., navy yard.

Develops Broaching Lathe

(Concluded from Page 30)

loading fixture. The slide which carries the broaches then returns to starting position and automatically stops there, ready for the next operating cycle.

The feed to the broach slide is by means of a large diameter screw and extremely heavy bronze nut adjustable for wear. The machine is equipped with anti-friction bearings throughout, including the main spindles. It is of the double-end drive type with herringbone gears mounted on the main spindles. Lubrication is automatic by a force-feed system.

A 20 hp. motor is employed for the main drive and a 10-hp. motor for the feed to the broach slide. A 2½-hp. motor drives the pump for the hydraulic chucks and for the hydraulically-operated steadyrest. The machine is of rugged construction throughout and, with motors and electrical control, weighs approximately 41,000 lb. Patents are pending covering the new features.

This Week on the Assembly Line

(Concluded from Page 45)

amounted to 1,198,853 units in the first 11 months of 1934, compared with 847,740 units in the same period of 1933. Domestic dealers reduced their stocks during November by 23,704 units. In fact, the slowness with which new models are making their appearance has resulted in retail stocks throughout the industry being pared down below normal for this time of the year. Three thousand Pontiac dealers, for example, have on hand only one car apiece, and 1700 are classified as demonstrators.

Chrysler Corpn. shipped 541,214 units in the period from Jan. 1 to Nov. 30, as against 442,174 in the corresponding months a year ago. Plymouth's share of the total was 325,772 cars. With around 35,000 cars to be assembled in December, Plymouth will make this year about 360,000 units, compared with 261,000 in 1933 and 125,000 in 1932. Plymouth is counting on production and sale of 400,000 units the coming year. It can build that number of cars with its present equipment in its local plant. One naturally thinks of the possibility that Plymouth might set up branch assembly plants, as Ford and Chevrolet have done, but such action is considered remote.

To strengthen its relationship with dealers and get a cross-section of dealer opinion, General Motors has established four dealer councils throughout the United States. Each council is comprised of 12 members, who will serve for a period of six months and then be succeeded by other dealers. Membership of each council will be representative of all G.M. divisions.

Steel releases from Ford, General Motors divisions and Chrysler have been in much larger volume the past week. Chevrolet is expected this week to place initial steel orders at Flint for its 1935 Master car. Great Lakes Steel Corpn. is operating six out of eight open-hearth furnaces and shortly is expected to increase production to full capacity.

To Confer on Basing Point Investigation

WASHINGTON, Dec. 11.—Efforts to coordinate the divergent views of the Federal Trade Commission and the National Recovery Administration regarding their separate reports on the basing point system in the iron and steel industry will be made at a meeting of representatives of the two bodies on Dec. 21.

The commission report was sent to the White House recently, while the NRA withheld its report. Meanwhile it asked Donald Richberg, director, National Emergency Council, to find out from the President whether he wanted the reports coordinated, if possible, and submitted to him as a single study. The proposed meeting of members of the commission and the NRA has been called to see if the two bodies can agree. Unless each has changed its original position on the question, there seems little likelihood that a joint report can be made.

SPECIALIZED PRODUCTION assures NON-POROUS PEEL-PROOF PLATING

Thomastrip, pre-coated with zinc, copper or cadmium, is the exclusive specification of many manufacturers of metal products. Non-porous, crack-proof and peel-proof coatings as applied by the specialized Thomas process, provide lasting protection and appearance... The cost, product, and sales advantages of this better material are quickly recognized on test. Check Thomastrip for your product. Write for test samples or consult a Thomas representative without obligation.

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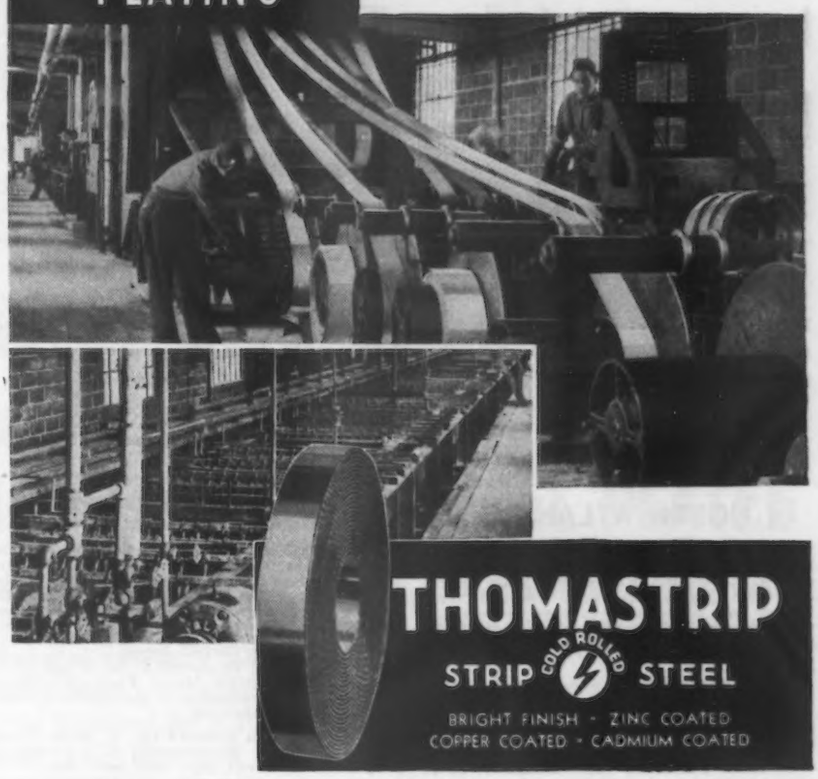


THOMASTRIP
STRIP COLD ROLLED STEEL
BRIGHT FINISH - ZINC COATED
COPPER COATED - CADMIUM COATED

PLANT EXPANSION AND EQUIPMENT BUYING

Army Ordnance Awards Still Hold Interest in Machine Tool Trade

IN spite of the fact that general demand for machine tools has not dropped off as much as had been anticipated this month, awards by the Army Ordnance Department continue to hold the center of interest. Orders placed last week amounted to $470,856, and tools costing more than three times as much are yet to be placed. In most instances, business is being well distributed and practically all machine tool builders will enter the new year with improved backlogs as a result of the Government's activity.

No additional automotive business is being placed, but considerable buying from that quarter is expected as soon as the rush to get new models before the public is over. Inquiry is still considered satisfactory and orders for single tools are reported from all principal districts.

NORTH ATLANTIC

A. P. W. Paper Co., Broadway, Albany, N. Y., has asked bids on general contract for new multi-story paper converting plant on site of present Liberty paper mill. Plant at North Albany will be removed to new location and increased capacity arranged. Cost about $400,000 with equipment. Roger W. Bell is general manager.

Cidega Machine Shop, Inc., New York, recently organized by Bruno Deri, 1626 Lexington Avenue, and associates, has leased space in building at 141 West Twentieth Street, for new machine shop and repair works.

Board of Education, East Rockaway, L. I., plans manual training department in new multi-story high school, for which general contract has been let to Jonwal Construction Co., 220 East Forty-second Street. Cost over $255,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 21 for forgings for flexible couplings (Schedule 3889) for Brooklyn and Philadelphia Navy yards; gate valves and spare seat rings (Schedule 3913) for Brooklyn, Philadelphia and Charleston yards.

Ford Motor Sales Co., and interest of Ford Motor Co., 1710 Broadway, New York, has leased five-story building at 233-39 West Fifty-fourth Street, 80 x 100 ft., totaling about 40,000 sq. ft. floor space, and will remodel for local branch, including repair and service shops.

Walker Spring Co., Inc., Newburgh, N. Y., has been organized under direction of Morris Meyers, Times Building, New York, representative, to manufacture steel springs for furniture and other service.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Dec. 17 for 75,000 ft. wire for Brooklyn and Chicago (Circular 61); lead-covered cable and four reels (Circular 55); until Dec. 19, keying amplifiers (Circular 60); for rectifier and converter unit (Circular 58) for Brooklyn.

Metal Purchasing Co., 50 Van Dam Street, New York, has leased space in building at 437-53 Eleventh Avenue, for new metal products storage and distributing plant.

Strang Tube & Cap Mfg. Co., Inc., Camden, N. J., has been organized by E. G. Netherby and M. E. Johnson, care of M. LeRoy Cobbin, 232 Market Street, representative, to manufacture metal tubing, metal bottle caps and seals, etc.

Felco Faucet Corpn., Jersey City, N. J., has been organized by Joseph J. Levin and Morris Fellerman, care of Meyer Pesin, 361 Central Avenue, representative, to manufacture faucets and kindred products.

Pennsylvania Railroad Co., 15 North Thirty-second Street, Philadelphia, E. J. Lamneck, purchasing agent, asks bids until Dec. 19 for construction of two steel coal barges (Contract 24-1934).

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until Dec. 17 for complete unit heaters, with automatic temperature regulators, etc., for heat-treating shop (Circular 183).

OHIO AND INDIANA

Triplex Screw Co., 5317 Grant Avenue, Cleveland, has let general contract to H. L. Vokes Co., 5300 Chester Avenue, for one-story addition, 20 x 60 ft., for storage and distribution.

Department of Water, City Hall, Cincinnati, Albert Hibbs, superintendent, has engaged Fosdick & Hilmer, Union Trust Building, consulting engineers, to draw plans for new electric-operated pumping plant in Western Hills district, and plans early bids for four pumping units and accessory equipment. Cost about $75,000. Joseph G. Steinkamp & Brother, Mercantile Library Building, are architects.

Kroger Grocery & Baking Co., 35 East Seventh Street, Cincinnati, has plans for two-story addition, 120 x 140 ft., to factory branch, storage and distributing plant at Columbus, Ohio. Cost over $50,000 with equipment. Company will soon begin erection of new power house at Cincinnati. Cost about $125,000 with equipment. Fosdick & Hilmer, Union Trust Building, are consulting engineers for last noted work.

City Council, Wapakoneta, Ohio, has plans by Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., consulting engineer, for new municipal electric light and power plant, for which fund of $160,000 has been authorized. Bids will be asked early next year.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 17 for two hydraulic jacks, wing-type (Circular 347); until Dec. 18, two 42-in. sheet dryers and two vertical sheet washers (Circular 351), 125 cockpit heater valve assemblies and 125 heater shell assemblies (Circular 350), 12 projectors (Circular 352); until Dec. 20, 271 compasses, 271 hairspring dividers, 271 parallel rules, etc. (Circular 354), 2300 aircraft joints (Circular 353).

Submerged Combustion Co. of America, Inc., 806 First Trust Building, Hammond, Ind., has been organized by Paul T. McCain and Kal Walter, to manufacture special combustion equipment and kindred engineering products.

International Harvester Co. of America, Inc., Chicago, has leased one-story building at Decatur, Ind., to be erected by Frank McConnell & Son, Decatur, for new factory branch, storage and distributing plant for motor truck division. Leroy Bradley, 221 West Wayne Street, Wayne, Ind., is architect.

NEW ENGLAND

Commanding Officer, Springfield Armory, Springfield, Mass., asks bids until Dec. 18 for 787 strap pipe wrenches, 20-in. long strap (Circular 43).

Framanco Co., Boston, has been organized by Henry Borden and Frederic M. McIntire, 1600 Massachusetts Avenue, Cambridge, Mass., to manufacture metal goods.

James Hanley Brewing Co., Jackson and Eddy Streets, Providence, R. I., has let general contract to Sullivan Construction Co., 357 Westminster Street, for extensions and improvements. New equipment will be installed. Cost over $100,000 with machinery.

Kelley & Callahan, Inc., Winchester, Mass., has been organized by Joseph E. Kelley and Joseph T. Callahan, 27 Clark Street, to manufacture oil burners and oil-burning equipment.

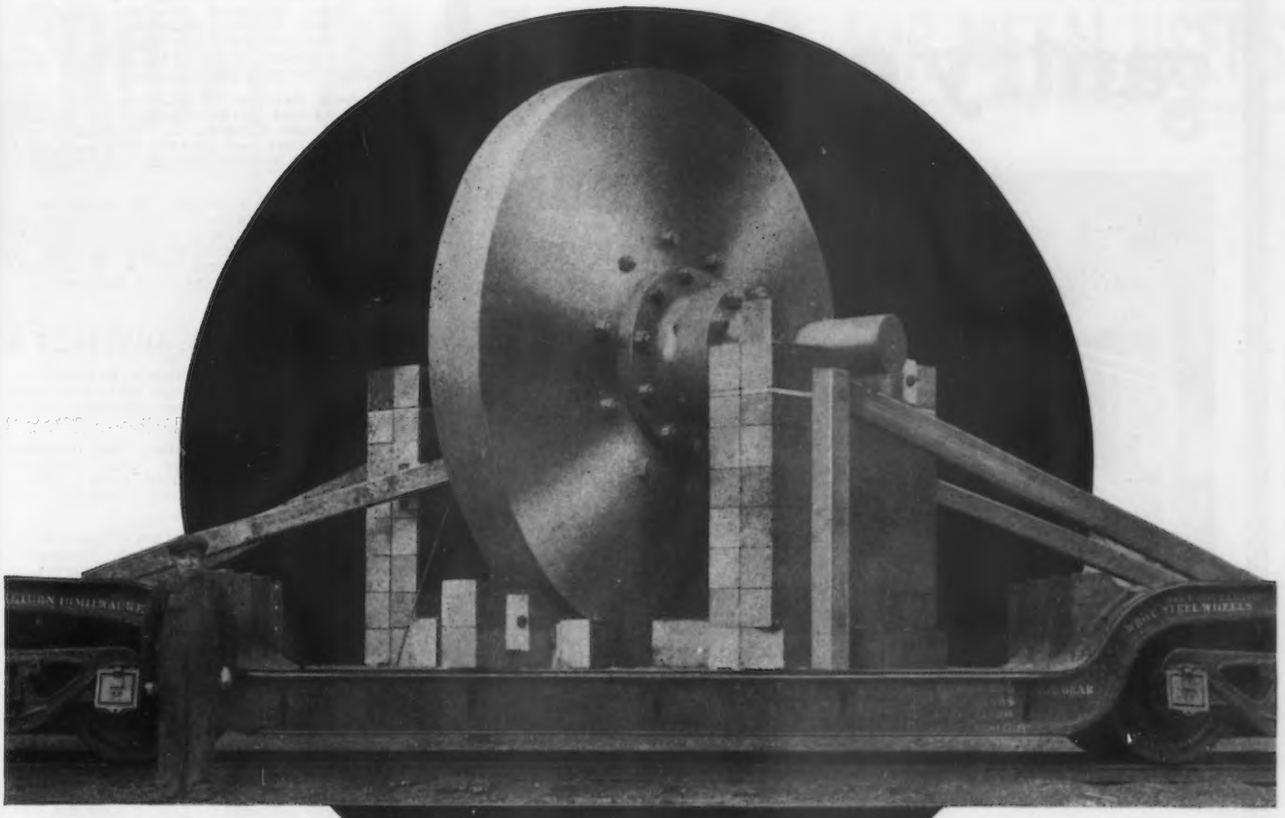
Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 18 for steel forgings for shafting (Schedule 3911) for Boston, Norfolk and other navy yards.

SOUTH CENTRAL

Bavarian Brewing Co., Twelfth and Pike Streets, Covington, Ky., has plans for two-story and basement addition, including mechanical bottling works. Alterations and improvements have begun on present plant. New equipment will be installed. Cost over $90,000 with machinery. Leslie S. Deglow, Electric Building, and Carl J. Kiefer, Schmidt Building, both Cincinnati, are architect and consulting engineer respectively.

Hill & Griffith Co., Thirtieth Street and Sixth Avenue, Birmingham, manufacturer of foundry facings and kindred equipment, plans rebuilding part of plant recently destroyed by fire. Loss about $100,000 with equipment.

Tennessee Valley Authority, New Sprankle Building, Knoxville, Tenn., plans hydroelectric



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FABRICATED FROM STEEL PLATES

● Flywheels up to fifteen feet in diameter and thirty-two tons in weight have been successfully fabricated from rolled steel plates. Here illustrated is the flywheel for a 1000 H.P., 2200 volt A.C. Flywheel induction motor generator set.

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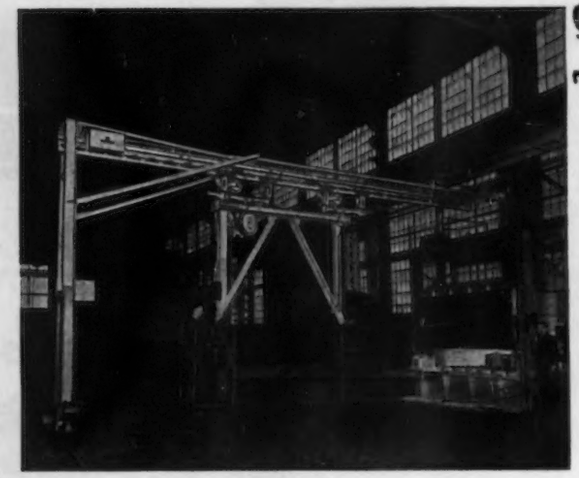

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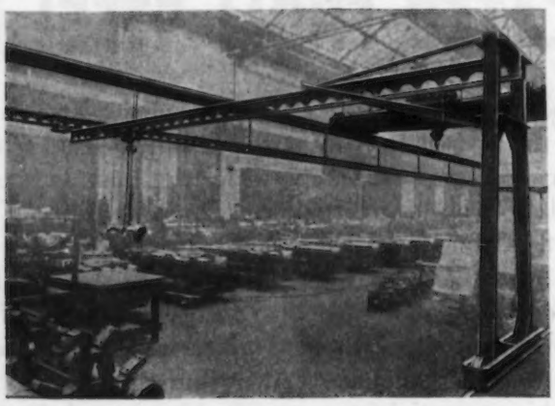

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WICKLIFFE OHIO

generating plant in connection with new control dam on Tennessee River, near Pickwick Landing, Tenn., for which plans are under way. Project will include transmission line, power substations and switching stations, and distribution system. Fund of $22,000,000 is being arranged for complete program.

Latonia Refining Co., Latonia, Ky., plans extensions and improvements in oil refinery, including new buildings and equipment, pipe lines, etc. Cost over $350,000 with equipment. Headquarters are in Midland Bank Building, Cleveland.

Common Council, Sunset, La., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal water system. Fund of $29,000 has been arranged through Federal aid. J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

WESTERN PA. DISTRICT

Pittsburgh & West Virginia Railroad Co., Wabash Building, Pittsburgh, plans new coal-loading plant on Ohio River waterfront, Cross Creek district, W. Va.

Hillman Coal & Coke Co., First National Bank Building, Pittsburgh, plans improvements and extensions in river mine at Barking Station, Allegheny River, including new tipple pier and equipment.

St. Paul Coal Co., Pittsburgh, operated by H. C. Frick Estate, Frick Building, Pittsburgh, has purchased Har-Mar mining properties of Warner Collieries Co., Union Trust Building, Cleveland, near Morgantown, W. Va., and 650 acres of adjoining coal lands from other interests, and will develop, with installation of mining machinery, loading, conveying and other equipment.

BUFFALO DISTRICT

Department of Public Works, City Hall, Buffalo, George J. Summers, commissioner, plans new sewage disposal plant and system, including power machinery, pumping and other mechanical equipment. Cost $15,000,000. Financing is being arranged through Federal aid.

West End Brewing Co., Utica, N. Y., has let general contract to Pierce Jones, Inc., 618 Charlotte Street, Buffalo, for an addition. Cost over $60,000 with equipment.

Bishton Tool & Mfg. Co., Inc., Herkimer, N. Y., has been organized by Robert R. Bishton, 615 East German Street, and Fred W. Sauer, Main Street, to manufacture tools and other equipment.

SOUTH ATLANTIC

NoKoroso Corpn., 109 Fourth Street South, St. Petersburg, Fla., E. A. Mendel, secretary, recently organized, plans factory for manufacture of special corrosion-resisting refined oil products, lubricating oils, etc.

Scenic Highway Machine & Repair Shop, Inc., Lake Wales, Fla., has been organized by P. A. and George E. Wetmore, Lake Wales, to operate a general machine and repair works.

Common Council, Varnville, S. C., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal waterworks. Fund of $27,000 has been arranged.

SOUTHWEST

Superior Tool Co., Oklahoma City, Okla., A. F. Spengler, head, has leased building at Fourteenth Street and Montgall Avenue, Kansas City, Mo., for new plant and will remove present works to new location and increase capacity.

Philpott Valley Coal Co., Ozark, Ark., Knox Kershaw, Ozark, head, recently organized, plans development of local coal-mining property, with installation of coal-mining machinery, hoisting, conveying, loading and other equipment. Cost over $40,000.

Board of Education, Kansas City, Kan., George Widder, secretary, plans call for bids on general contract in January for new three-story and basement, H-shape, high school at Twenty-second Street and Minnesota Avenue. Manual training department will be installed. Cost $1,800,000 with equipment. Hamilton, Fellows & Nedved, 814 North Tower Court, Chicago, are architects; Joseph W. Radotinsky, Commercial National Bank Building, Kansas City, Kan., is associate architect.

Cumberland Brewing Co., St. Louis, recently organized by Ewald L. Wintermann, 3155 Rus-

FRONT PAGE NEWS FOR METAL USERS

What's Going On in the Nickel Alloy World—The New Economies—The New Equipment—The New Records for Dependability and Long Machinery Life—Read the Story Month by Month in "Nickel Steel Topics" and "Nickel Cast Iron News"—Sample copies on request

Nickel Steel Topics
Published in the Interest of Producers and Users of Nickel Alloy Steels
Nickel Cast Iron News
Published in the Interest of Producers and Users of Cast Iron
ALLOYED IRON SUPPLEMENTS NEW DESIGN
MIXING KETTLE LIFE EXTENDED BY NEW ALLOY
EFFECTS OF HEAT ON CAST IRONS DESCRIBED
Cost Analysis by Ford Establishes Economy in Use of Alloy Iron Dies
Pressure Vessels for Low Temperatures
Metal Men Gather for Annual Congress
Boulder Dam Cableway Has Capacity of 150 Tons
Stabilizers Minimize Ship Roll

NICKEL CAST IRON NEWS

In November Issue

1. Life of Coke Crusher Rolls Increased 6 Times by Use of "Ni-Hard" Iron.
2. Largest Municipal Power Plant Uses Giant Diesel Engines with Nickel Cast Iron Parts.
3. New Jack for Knee-Action Automobiles Built Largely of Nickel Cast Iron.
4. 50,000 Miles of Trouble-Free Marine Service is Record of Nickel Iron Cylinders and Pistons in Unaflow Type Engines.
5. Alloy Iron in Air-Conditioning Equipment.
6. "Pancake" Engine Developed for Increasing Capacity of Buses, Makes Large Use of Alloy Cast Irons.

NICKEL STEEL TOPICS

In December Issue

1. Welded Nickel Steel Vessels for Low Temperature Oil Refining Operation.
2. "Rainbow" and "Endeavour" Mast Braces Made Stronger and Lighter by Use of Nickel Chromium Steel.
3. New Nickel Molybdenum Steel for Bakelite Molds.
4. 24-Wheeled Vehicle Built in England to Travel Over Darkest Africa Uses Nickel Steels in Vital Parts.
5. Weldless Steel Chains Made by Special Mill with Rolls of Nickel Alloy Steel.
6. Paper Mill Effects Important Savings Using 3½% Nickel Steel Rolls.

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Hot and Cold Rolled Sheets ● Newport Electrical Sheets ● GOHI Pure Iron-Copper Alloy ● Globe Brand Galvanized Sheets ● GOHI Enameling Sheets ● Kentucky Copper Bearing Steel ● Newport Long Terne Sheets.
ENAMELING IRON
THE NEWPORT ROLLING MILL CO., NEWPORT, KY.

sell Street, and associates, has acquired six-story building on Clinch Avenue, Knoxville, Tenn., and will remodel for new brewery. Cost about $150,000 with equipment.

Rosenthal Packing Co., 3424 Commerce Street, Dallas, Tex., meat packer, has begun erection of new multi-unit plant on 2-acre tract, for which general contract has been let to A. K. Garwick, 4414 Worth Street. Cost about $70,000 with equipment. Smith, Brubaker & Egan, 30 North La Salle Street, Chicago, are architects and engineers.

WASHINGTON DISTRICT

Quartermaster Depot, Twentieth and C Streets, Washington, asks bids until Dec. 26 for 50 gasoline-electric generating sets, each 5-kw. capacity (Circular 75).

Town Council, Secretary, Md., will soon take bids for pumping machinery and accessories, steel tank and tower, pipe lines, etc., for municipal water system. J. R. Cronister, Cambridge, Md., is consulting engineer.

Appalachian Electric Power Co., Lynchburg, Va., plans new transmission line from Blackwater Creek district to city. Cost about $40,000. John E. Jackson is local manager. Headquarters are at Roanoke, Va.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 19 for rivets, machine bolts, nuts, brass bolts, wire nails, malleable iron pipe fittings, brass or bronze pipe fittings, cast iron flanges, 1000 malleable iron unions, galvanized steel parallel hooks, galvanized steel drop forged links, 5000 ft. pneumatic hose, 100,000 ft. solid copper wire, magnet wire, flexible hoisting cable, soft steel wire, brass rods, steel drill rods, 65,000 lb. galvanized sheet steel, 12 chain hoists and other equipment (Schedule 3015).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 18 for wrenches (Schedule 3885), 23,950 lb. boiler plate steel (Schedule 3884), 81,000 lb. zinc-coated steel, and 67,300 lb. sheet steel (Schedule 3882); until Dec. 21, vises (Schedule 3899), countersinks and reamers (Schedule 3898), files and rasps (Schedule 3892) for Eastern and Western navy yards; two motor-driven capstans and spare parts (Schedule 3891) for Sewall's Point, Va., yard; one vacuum pump and two centrifugal pumps (Schedule 3923) for Indian Head yard; until Dec. 18, two motors for hydraulic steering gear, and two motors for hydraulic power plant and spare parts (Schedule 3880) for Portsmouth yard.

MICHIGAN DISTRICT

Marion Machine, Foundry & Supply Co., Marion, Ind., plans one-story factory branch, storage and distributing plant near city limits at Mount Pleasant, Mich.

L. A. Young Spring & Wire Corpn., 9200 Russell Street, Detroit, plans new one-story wire-drawing mill near present works at Milwaukee Junction. Cost over $100,000 with equipment. Company has recently arranged trade agreement with New England High Carbon Wire Co., Millbury, Mass., to cover operation of new plant.

Carson Foundry & Mfg. Co., Tecumseh, Mich., has been organized by D. J. Carson, Tecumseh, and associates, to manufacture iron and other metal castings.

Winters & Crampton Corpn., Grandville, Mich., has been organized as an interest of Winters & Crampton Mfg. Co., Grandville, to manufacture refrigerator hardware and kindred products.

MIDDLE WEST

North American Distillers, Inc., Peoria, Ill., Edwin Lehmann, Peoria, president, has taken over former plant of United States Industrial Alcohol Corpn., 200 Broadway, New Orleans, and will remodel for new distillery. Cost over $45,000 with equipment. Company has established office at 1833 Canal Bank Building, New Orleans.

Pioneer Gold Producers, Inc., Durango, Colo., Martin B. Bates, Durango, president, plans development local gold-mining properties, and will install mine and mill equipment. Company is arranging for stock issue to total $170,000, considerable portion of fund to be used for purpose noted.

Krone Die-Casting Co., Room 1040, 10 South La Salle Street, Chicago, has been organized by W. F. Mayer and E. B. Patterson, to manufacture die-castings and kindred products.

School District No. 1, Butte Mont., plans manual training equipment in new three-story U-shaped high school, for which bids will soon be asked on general contract. Cost $800,000. Financing has been arranged through Federal aid. Bird & Van Teylingen, Medical Arts Building, Great Falls, Mont., are architects.

Canyon Corpn., Deadwood, S. D., operating Maintland Mine, near Deadwood, affiliated with Molybdenum Corpn. of America, Grant Building, Pittsburgh, Pa., has approved plans for new ore mill. Cost close to $100,000 with machinery. Whitaker & Schlereth, Denver, are consulting engineers. Luther B. Eames is resident manager.

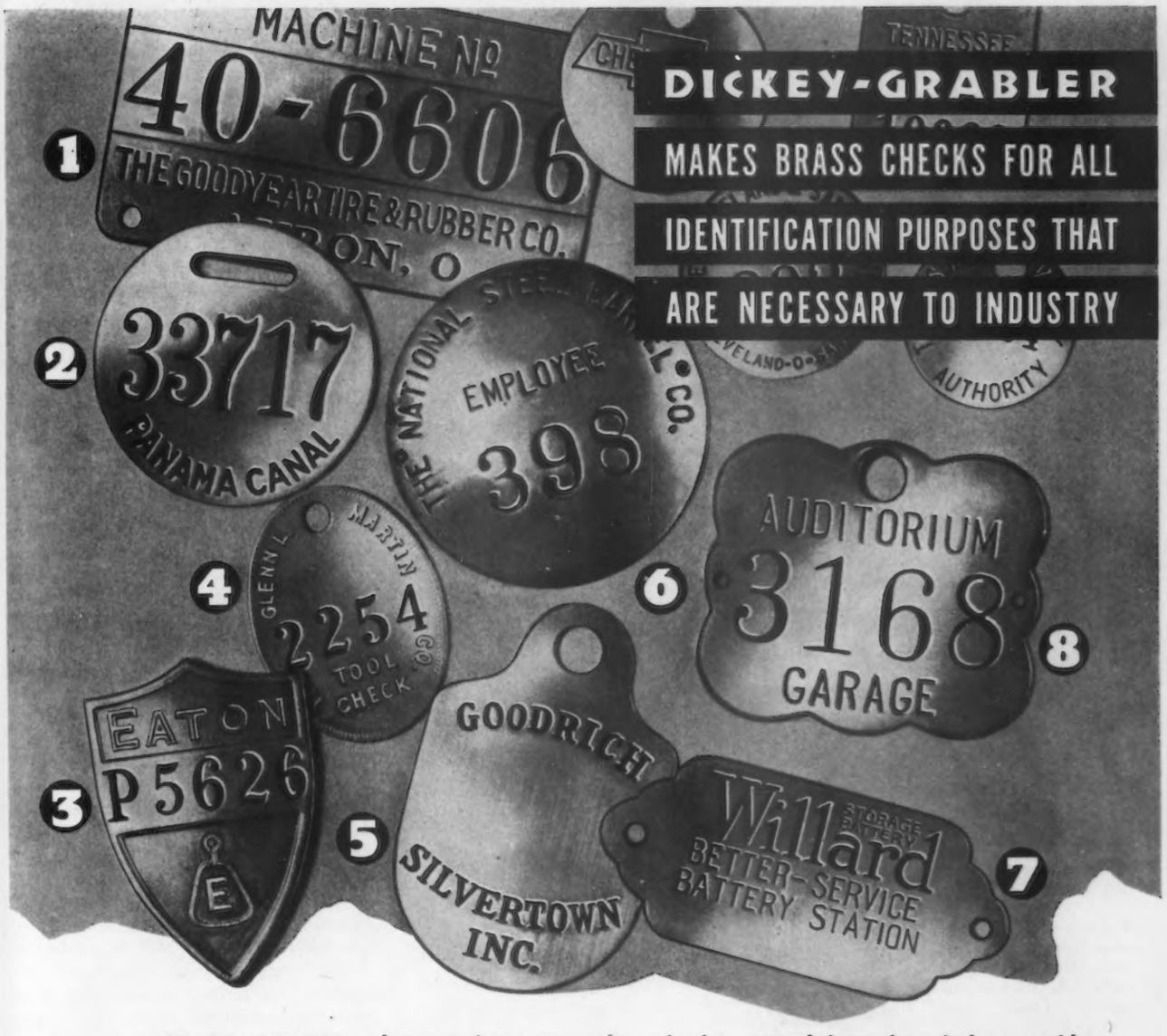
Interstate Coal Co., 37 West Van Buren Street, Chicago, plans rebuilding part of coal mining plant No. 22 at Sesser, Ill., recently destroyed by fire with loss of $75,000. Mine was reported in THE IRON AGE, Nov. 22, as having belonged to Brewerton Coal Co.

PACIFIC COAST

Bureau of Reclamation, Denver, asks bids until Dec. 27 for four motor-driven, three-stem, cylinder gate hoists for Boulder Dam power project, Boulder Canyon, each hoist to have lifting capacity of 500,000 lb.; 12 cast steel lower bulkhead gates for 325-ft. head, and 12 cast steel upper bulkhead gates for 175 ft. head, for installation in intake towers, same location (Specification 604).

Interstate Mining Corpn., Twin Falls, Idaho, care T. O. Boyd, Sr., Twin Falls, president, plans installation of mining equipment and mill at local gold-mining properties, including ore hoisting, conveying, loading and other equipment. Company is arranging for sale of stock to total $350,000, majority of proceeds to be used for purpose noted.

Coast Electric & Mfg. Co., 431 S. E. Sixth Street, Portland, Ore., manufacturer of electrical and mechanical equipment, has let general contract to Bickford Construction Co., 823 S. E. Twenty-eighth Street, for new one-story plant. Cost about $25,000 with equipment. Ernst Kroner, Portland, is architect.



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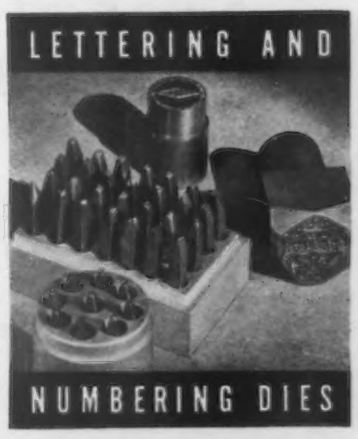

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Attractive Finish Helps Metal Products Sales

(Concluded from Page 19)

should be submitted showing the exact form of the face.

Distinction Between Polishing and Buffing Wheels

THE above comments apply in most cases to both buffing and polishing operations. The distinction between a buffing wheel and a polishing wheel, as already described in this series, is essentially one of applying the abrasive. On a polishing wheel abrasive material is applied with glue and therefore becomes a fixed part of the wheel. A buffing wheel usually receives its abrasive while it is in operation. It is frequently applied with a stick made up of an abrasive compound. Aside from this distinction, in practice there are many other differences between a buffing wheel and a polishing wheel.

A typical buff is made of cotton, while a typical polishing wheel may be said to be made of canvas. Metal parts are most frequently buffed after plating or preparatory to plating, and buffing is more often associated with brass or non-ferrous metals than with steel. The same part, for instance, when made of steel, may be finished by polishing when it would be buffed if made of brass.

Classification of Buffing Operations

Buffing operations are divided into two general classifications, cutting down and coloring. In the case of buffing of a flat brass part, the wheel used for cutting down would be a full disk buff made of cotton sheeting with a weave described as 84-92. That is, the fabric has 84 threads to the inch in the warp and 92 threads in the filling. Coloring follows with a similar wheel made of cotton disks having a 64-68 specification, and in case a mirror finish is desired, with as many buffing lines removed as possible, a wheel made of cotton flannel disks would probably be used. For very soft metals, such as some kinds of copper and zinc, still more loosely woven cotton sheeting is used, and a typical specification for this work is 48-48. An almost endless variety of patented or specially designed buffs is available. Often a buff is made up without any sewing. The disks are stamped to proper shape with dies and the stamped disks are then slipped on to a hub and clamped together by means of side pieces fastened to the hub.

Rubber "Tire-Tape"

A NEW electric and mending tape, built up with over 90 per cent pure rubber content, and tested, it is said, to more than 8000 volts in single thickness, has been listed by the Underwriters Laboratories for industrial and household use and is being marketed by the B. F. Goodrich Co., Akron, Ohio. Holland cloth protects the sticky rubber surface prior to use. Directions for use after cloth removal call for a rolling application rather than the customary spiral application. The product is said to possess an extremely wide range of uses in addition to insulation and repairs, including handle or grip wrapping, weather stripping and anti-rattle service. Distribution is through demonstration-carton procedure.